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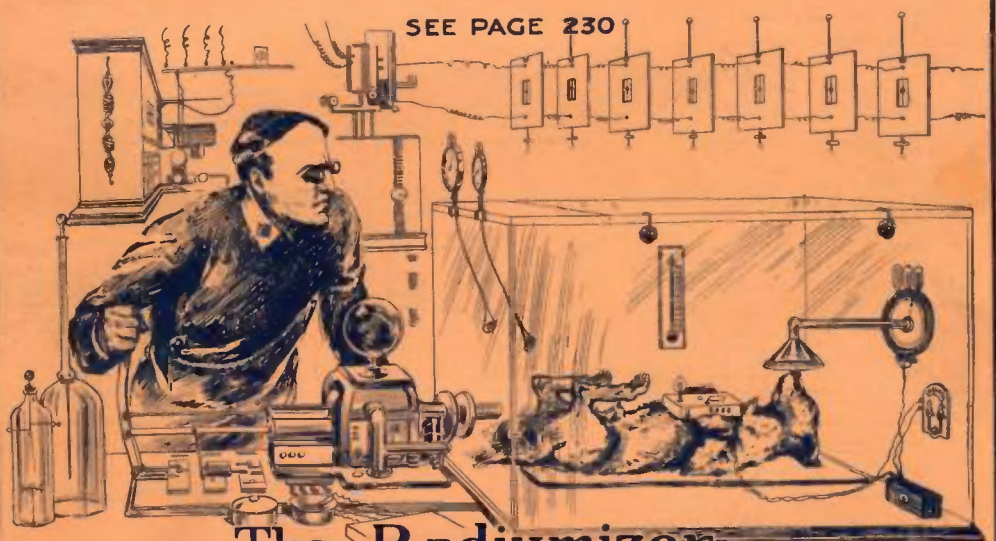

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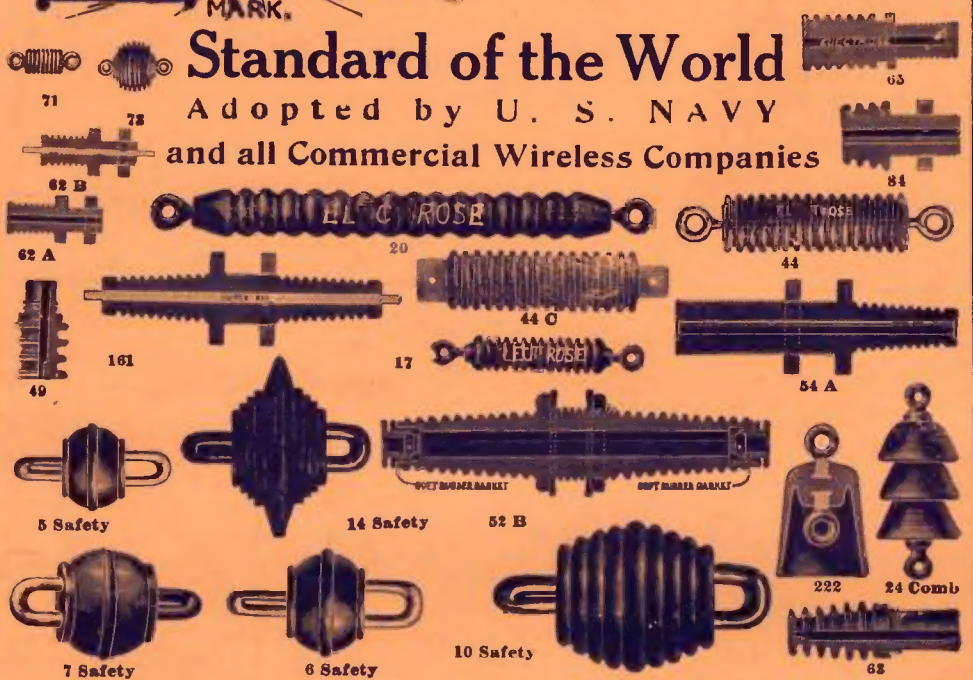

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Modern Electrics

VOL. IV. JULY, 1911. No. 4.

The Practical Electrician

A Popular Course in Electricity on the Construction of Electrical Apparatus and Experiments to be Conducted with them

By PROFESSOR W. WEILER, of the University of Esslingen, (Germany)

Translation by H. GERNSBACK

CHAPTER I.—Continued.

BICHROMATE BATTERY WITH POROUS CUP.

FIGURE 33 shows this battery which is composed of an outer jar of glass or earthenware, the porous cup, and the carbon plate in a solution of bichromate of potassium—sulphuric acid—water, and the zinc cylinder

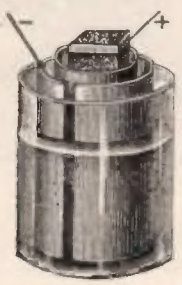

Fig. 33

standing outside of the cup in a solution of diluted sulphuric acid.

This arrangement can be reversed, however, by having the carbon elec-

Fig. 34

Carbon Electrode

trodes, Fig. 34, outside of the porous cup in the bichromate solution and the zinc with the diluted acid inside of the porous cup. The former method, however, is preferable.

The zinc must always be well amalgamated and should preferably stand in a little pool of mercury; the porous cup along the upper edge is paraffined thoroughly.

The solution for such batteries is usually composed of the following:

130 parts of hot water, 20 parts bichromate of potash to be dissolved in the water. When cool add 50 parts concentrated sulphuric acid.

A battery having 4¾ oz. water, ¾ oz. bichromate of potash, and 1 5/7 oz.

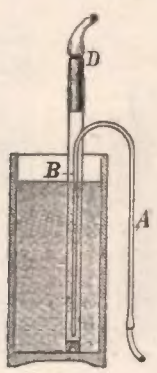

Fig. 35

of sulphuric acid, furnishes a current of 1.5 amperes and 1.8 volts. Every 2 weeks the sulphuric acid must be renewed and the zinc must be well cleaned with a rough brush; the bichromate solution needs only to be renewed when it begins to turn green.

In order to empty quickly a number of batteries, a syphon as shown in Fig. 35 gives good service. The long end is introduced into the solution to be drawn off, while the air is drawn out from the short tube. Once started the

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solution flows into the bottle till it is full.

The syphon shown in Fig. 36 is easier to handle than the one shown before. There are two glass tubes, B and

Fig. 36

A. A is fused into B as shown. At the bottom B is provided with a rubber stopper having a hole about the diameter of A. If one blows into the rubber hose, D, attached onto B, the solution will run out of A. To stop the flow, blow again into D.

The Fuller Battery (1871) is quite well known here and abroad. In the porous cup a heavy zinc block is placed, surrounded at the bottom with a pool of mercury to keep the zinc

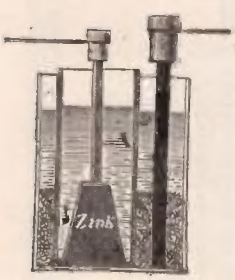

Fig. 36a
Fuller Battery

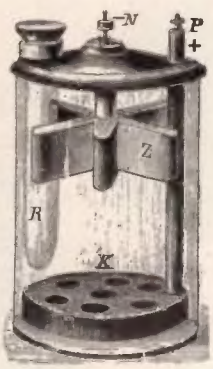

Fig 37

amalgamated. There is no acid in the cup, but plain water is used. The carbon plate stands in 9 parts water and 1 part sulphuric acid; on the bottom of the vessel a thick layer of bichromate of potash crystals is placed.

This battery is quite constant and gives about 2 volts. The amperage is according to the size of the elements used. If the battery is exhausted, the orange color of the solution turns blue; it is then necessary to replenish the crystal supply. If the voltage falls, new sulphuric acid must be added.

The Partz battery is shown in Fig. 37. On the bottom of the glass is a round carbon plate, K, into which a carbon rod is forced. This furnishes the positive pole, P (+), of the battery. The zinc star, Z, is suspended centrally from the cover and furnishes the negative pole, N (—). This battery is filled with a solution of ordinary cooking salt.

In the tube, "R", small pieces of bichromate of potash and potassium bisulphate are placed in the proportion of 1 to 2; inasmuch as the solution in the Tube, "R" is heavier it sinks down under the salt solution and stays there

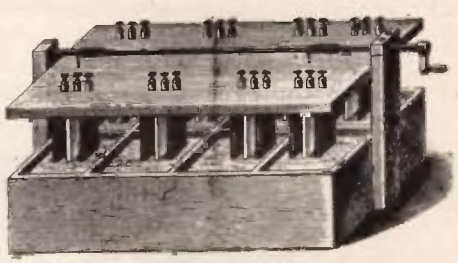

Fig. 38

by gravity. The voltage of this battery is 2.

Bichromate of potash is poisonous and the hands and fingers should never be introduced into the solution of same as fresh cuts, bruises, etc., usually become worse.

31.—A PLUNGE BATTERY, WOODEN VESSELS.

Illustrations No. 38 and 39 show the Plunge Battery with the usual bichromate of potash solution. If wooden vessels are to be used for Plunge Batteries, a box is made as shown in Fig. 38, divided into sections as shown. All the wood parts should be boiled in paraffine and the corners and edges where boards meet should be filled with hot paraffine or marine glue.

Holes and other openings may be closed with the following cement:

Sulphur 100 parts, suet 2 parts, resin 2 parts. Over a slow fire melt the sulphur and the suet together and under steady stirring add the finely powdered resin.

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Another varnish which resists acids may be made as follows:

Coal tar is heated to 70 degrees centigrade and under steady stirring add the same weight of Portland cement or caustic lime; this varnish will never become brittle.

Fig. 38 shows a Plunge Battery with a box painted with above-mentioned varnish having 8 partitions. The solution is of the bichromate of potash kind as already described. There is one zinc electrode between 2 carbon plates; the 3 electrodes are fastened to the wood cover. Both carbon plates are connected together and the zinc of one cell is connected to the carbons of the next. The entire cover carrying all the electrodes is raised and lowered into the solution by means of a crank and two stout cords fastened as shown

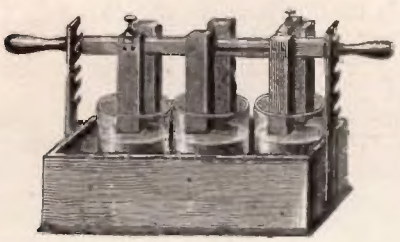

Fig. 39

in illustration. The dimensions of the plates are left to the designer.

The battery shown in Fig. 39 gives fairly strong currents for a short time. The length of the electrodes is about 8 inches and 2 inches wide.

In all bichromate of potash batteries, it is necessary to draw out the electrodes from the battery when not in use or else the acid will quickly consume the zinc even if same is amalgamated. It is a mistaken idea to leave the carbons in the solution and only to withdraw the zinc as shown in illustration 31, because it has been found that the carbon, if left in the solution for any length of time, deteriorates and loses its efficiency. However, such carbons may be used again by boiling them for several hours in water.

32.—DRIP BATTERIES.

Fig. 40 shows the principle of this battery and has been adopted because it has been found that the bichromate of potash solution quickly loses its efficiency when left standing. If the same solution is kept in motion, it can be made to give from 6 to 10 times its former efficiency. The reason for this is that the solution must be supplied constantly with oxygen which can only be obtained if for instance air is introduced into the battery itself or if the solution comes directly in contact with the air. Figs. 40 and 41 show this principle. Fig. 40 shows 4 wooden vessels constructed in the same man-

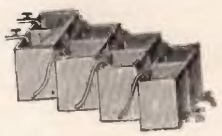

Fig. 40

ner as the vessel in Fig. 38. Tubes of glass, soft rubber or lead bring the solution of the first battery from the bottom of the uppermost vessel to the surface of the next following lower one. Inasmuch as the solution circulates all the time, a powerful current is obtained and the polarization is, of course, much less.

An excellent battery for electrical illumination which may be used for long hours at a stretch, in fact as long as there is any solution and good zincs, is shown in Fig. 41, and this is an invention of Mr. P. H. Hauck. On a wooden or other trestle, arranged in stairs as shown, a glass container about a foot square and about a foot high is placed; this has a glass faucet at the bottom, which controls the outflow of

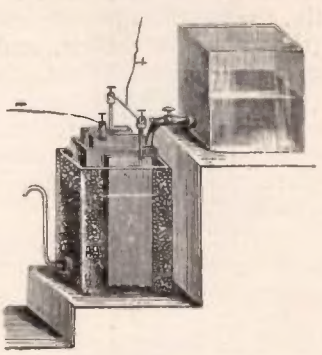

Fig. 41

the liquid of the glass tank. On the next stair below is placed another vessel which contains, in the center, a

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square porous vessel with a zinc plate.

The solution in the porous vessel is diluted sulphuric acid; the zinc, of course, must be well amalgamated. Outside of the porous cup next to the wall of the container, are placed 2 carbon plates which are surrounded by small pieces of coke. In fact the entire space between the container and porous cup is filled with this coke. The two carbon plates are connected together as shown. At the bottom of the container is a hole in which is fitted a soft rubber stopper carrying the glass tube. This glass tube goes to the top of the next container. Four such batteries are placed one below the other and it is, of course, understood that the bichromate of potash solution is on the outside of the porous cup. The glass stop-cock in the top container of the stair is now opened and the solution is made to fall in the first battery

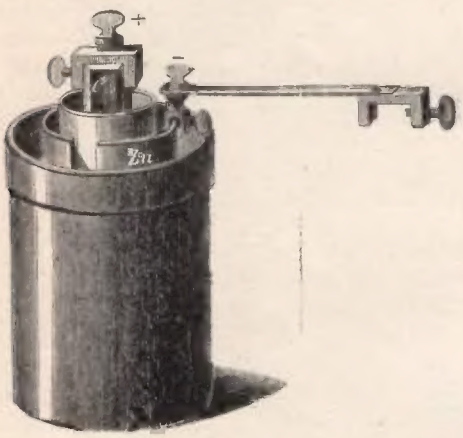

Fig. 42

by means of a very small stream. Consequently, the solution passes from one cell to the next one below, and thus circulates all the time. From the last battery it is collected in a tank and as soon as this is full it is again returned into the top vesel and thus continues to circulate until the solution is entirely exhausted.

Such a battery is very suitable for lighting, it gives 2 volts and a very large amperage all according to the size of the plates. The battery can also be used for charging storage batteries and will work constantly for over 24 hours without attention.

One good point of this battery is that it can be easily cleaned by putting hot water in the uppermost vessel and let this flow through the batteries several times. This method cleans out the pores of the battery and renders them as good as new.

33.—NITRIC ACID BATTERIES, GROVE AND BUNSEN.

Fig. 42 shows the well-known Bunsen Battery which is one of the most powerful and best batteries ever invented. The outside container holds a solution of sulphuric acid, made by pouring one part of Commercial Sulphuric Acid into nine parts of water. A heavy zinc cylinder is used, which must be well amalgamated outside and inside. In the inside of the zinc cylinder a porous cup is placed as shown, in the center of which is a carbon plate. The porous cup is then filled up with nitric acid 38 degrees.

In the Grove Battery, which is shown in Fig. 43, a piece of platinum foil is used instead of the carbon. This battery, however, on account of the high cost of platinum is little used, any longer.

The nitric acid (HNO_3) is sometimes mixed with an even volume of muriatic acid, or the nitric acid may be produced by placing salpetre (KNO_3) and sulphuric acid (H_2SO_4) in the porous cup; the battery will then work more constantly.

DISADVANTAGES AND ADVANTAGES OF THE BUNSEN BATTERY.

The nitric acid develops obnoxious fumes which are very disagreeable, although not poisonous; the E. M. F. decreases with the change of the acid; the zinc is attacked even if no current is used; because the nitric acid constantly filters through the porous cup. However, the Bunsen battery is used a great deal where strong currents are wanted for extended periods, and this battery was used perhaps more than any other one, before the invention of the dynamo. The battery is very powerful and gives about 1.93 volts and a battery about 7 inches high gives upwards of 30 amperes. They are especially used to charge storage batteries, etc.

There have been many proposals to do away with the obnoxious fumes generated by the Bunsen battery, the best one being probably the method devised by Mr. Gernsback in 1903, described in

(Continued on Page 223)

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A New System of Wireless Telephony

By Victor H. Laughter.

NOTEWORTHY demonstrations have been recently given by William Dubilier of his new wireless telephone. The tests were held between Seattle and Tacoma, a distance of thirty miles, and in every instance the received speech was clear and distinct; and the writer who had the pleasure of witnessing a number of the tests believes that the distance between the stations could be extended many miles farther without detriment to the working of the apparatus. The Government station at Tatoosh one hundred and twenty-eight miles distant picked up the messages on a number of occasions.

Fig. 1

The Dubilier system embodies a number of distinct and original features.

The greatest difficulties heretofore encountered in wireless telephony has been the unstable features of the arc and the low current carrying capacity of the transmitter. These points Dubilier has apparently overcome, for in the tests referred to above, the set was operated continuously for hours at a time with good talking results and small heating effect noticeable at the transmitter.

The winding of the oscillation transformer is such that the magnetic field on both sides of the primary is utilized thereby giving increased radiation—or at least increased over the usual method where only one winding is employed for the secondary.

A complete view of the transmitting set is shown in Fig. 1. It consists of the case containing the oscillation transformer and condenser with the transmitter and oscillator mounted on top. A better view of the oscillator is shown in Fig. 2. It consists of a porcelain tube through ends of which the electrodes are inserted and held by means of collars insulated with mica bushings and the tube mounted on a base of one inch marble six inches in diameter. The distance between the electrodes can be regulated by the handle shown on top in Fig. 1, and is so made that it is only necessary to close

Fig. 2.

the switch of the main circuit, the discharge of the condenser being enough to close the gap. The radiating flanges are spaced about an eighth of an inch apart and are about five inches in diameter for the smaller arcs, and seem to absorb the heat very rapidly.

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A very ingenious method has been adapted to get rid of the irregular action as previously mentioned. The anode is made of hard phosphor bronze while the cathode is made of a secret alloy of which the composition cannot

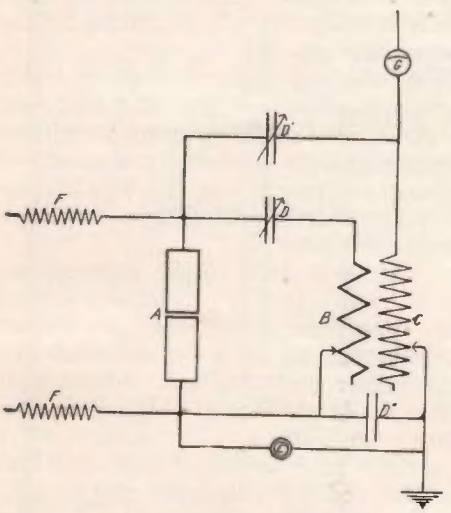

Fig. 3

be given out at the present. The arc is maintained in a field of ordinary house gas. In operation the cathode burns away but the composition of which it is made, possesses the peculiar characteristic of allowing the particles to be decomposed by the gas, and in turn are deposited back on the cathode

Fig. 4.

thus rebuilding and holding the arc at a steady potential.

The oscillation circuit is composed of fixed units, tuning being accomplished by varying the resistance of the oscillator only. The wiring diagram of the circuit is shown in Fig. 3. It consists of the arc connected to a 220 or 200 volt direct circuit through the choke coils F.F. An oscillating circuit consisting of the primary B, and the variable condenser D is shunted around the arc. A second oscillating circuit consisting of the secondary C and variable condenser D^1 is also shunted around the arc. The special transmitter E is connected across from the lower leg of the radiating circuit to the primary oscillating circuit. G shows the hot-wire ammeter.

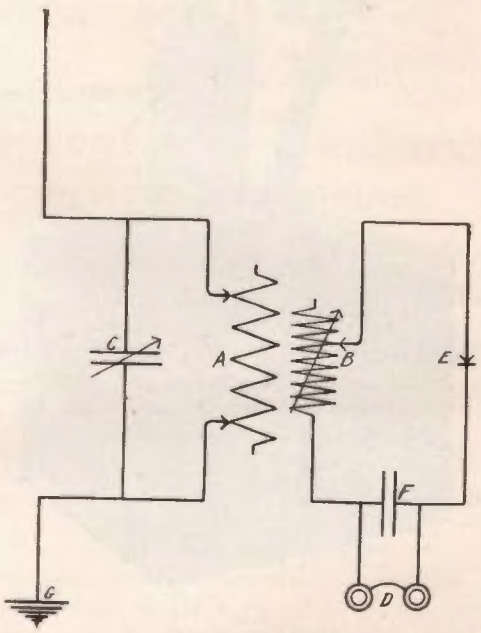

Fig. 5

On examination it will be noticed that three oscillating circuits are employed. First, the primary oscillating circuit, second, the secondary oscillating circuit and third, an open circuit oscillator comprising the leads direct from the aerial and ground to the arc A through condensers D^1 and D^3. In this third circuit no account is taken of the secondary C as the aerial is affected direct by the oscillations at certain points of the adjustment. This method of connecting gives an efficiency output of 60 per cent. The actual radiative power can be varied from 90 to 220 watts and even greater, depending on the amount of energy employed at the oscillator.

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A photograph of the receiving set is shown in Fig. 4. The wiring diagram is shown in Fig. 5. The circuit is of the inductive coupled type with means for varying the wave length from 200 to 4,000 meters. It consists of the primary coil A, shunted with the variable condenser C and provided with a sliding contact which leads to ground T.

Fig. 6.

The secondary is shown at B with the head receivers D shunted with the fixed condenser and the detector E in series and connected to B by means of the sliding contact.

The crystal type of detector is employed and gives excellent results. The complete receiving set is mounted in a box 7x7x8 inches. In fact the complete apparatus for sending and receiving does not occupy a space larger than four cubic feet.

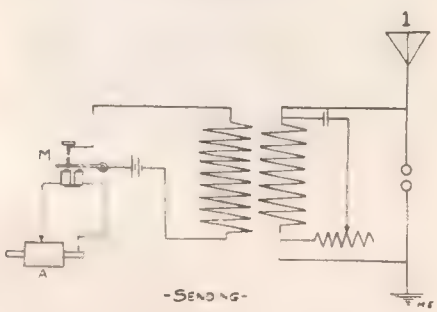
A photograph of the tower which is second to the highest in the world is shown in Fig. 6. The tower is built up of wooden pillars, which interlap, the base being firmly imbedded in concrete, and guys placed on at the different sections.

The tower is 320 feet high and is on a bluff 500 feet which makes a total height of 820 feet above sea level. The aerial is of the umbrella type and covers about 30 acres of land. The ground is made of wire netting imbedded several feet deep around the entire circumference of the station. Means are utilized for keeping the ground permanently damp.

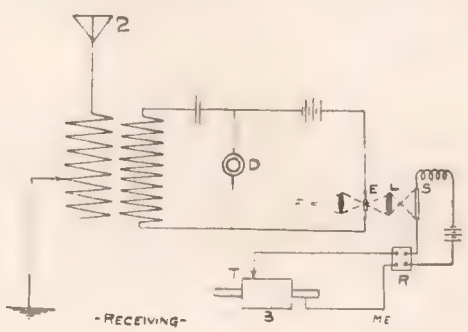
This station will be equipped with the wireless telephone and telegraph, and the inventor expects to hold regular communication with all Alaskan stations in addition to steamers and other Coast stations.

PICTURES BY WIRELESS.

An English inventor uses an apparatus for sending pictures by wireless in which the transmitting station has a cylinder, A, containing the picture in insulating ink on a metal surface, so that the contacts will operate the relay, M, and the aerial, 1. The waves are received in aerial 2, and the detector, D, operates a receiving device. It consists of metal wire, E, stretched between magnet poles so that it is deflected by the current. When a signal passes, the wire is deflected and a small shutter, which it carries allows light from F to



fall on the selenium cell, S. This sends current by means of relay, R, into a chemical recording drum, B, so that



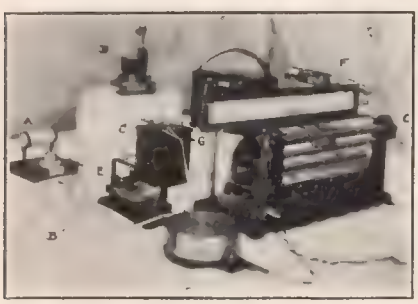
when current passes, the metal point, T, will make a mark upon the chemical paper carried by the drum, and the picture is thus reproduced.

New Instrument

By A. C. Marlowe.

(Paris Correspondent "Modern Electrics.")

IN carrying out different kinds of galvanometer work it is often required to trace curves which show the swing of the galvanometer with reference to the time, but where a moving needle is used this would involve a registering device such as a tracer mounted on a drum which needs quite an amount of mechanism. On the other hand where a galvanometer with a moving spot of light is employed, it becomes still more difficult to have a record of the curves, as this would need to be done generally by a photographic method. In order to avoid this difficulty the following convenient instrument has been designed



by the Cambridge Scientific Instrument Company of England, and it can be used for tracing curves in any kind of work where the deflections are to be noted in relation to time. The present mounting shows it as used in thermo-electric researches upon metals. What makes the design much simpler is that the instrument is partly hand-operated.

The principle consists in fixing a rotating drum underneath a galvanometer scale and providing means for keeping a pointer so as to always coincide with the moving spot of light. A pencil is attached to this pointer and is in contact with the paper upon the drum. As will be seen in the photograph the thermo-couple is shown at B, while A is a small electric furnace of the tube type for heating steel or other metals while under test. D is the galvanometer with swinging mirror. Light is projected on to the mirror from the lens tube F having a Nernst lamp in the end, and the mirror reflects it thence on to the divided transparent scale G. This is mounted upon the Brearly curve tracer. L is a rotating drum upon which the paper is wrapped, and over it is a sliding carriage N carrying a pointer M. By using the handle O and the long screw S we can shift the pointer from one end of the scale to the other. Underneath M is fitted a pen or pencil and this bears upon the surface of the drum.

Suppose the spot of light keeps gradually moving about the scale during any given test, all that is needed is to observe it and work the pointer M so as to always follow the beam as it moves. The drum rotates meanwhile at a fixed speed. Thus we trace the beam's movement upon the drum by the pencil and thus have the proper curve relating to this experiment. The drum is 14 inches in circumference and 12 inches long, and by using change speed gears it can be made to give one revolution in either 10 or 30 minutes. In the apparatus which is here represented a scale 20 inches long is shown, but with another model of the instrument there is used a special scale about 4 feet 6 inches long. This scale is mounted on a suitable platform and is used at 6 feet working distance from the galvanometer.

A resistance box C is used in series with the galvanometer, together with a sliding resistance E, so as to adjust its sensitiveness to what may be needed in any given experiment. The galvanometer is of the Ayrton-Mather pattern in the present set, but any other suitable type of mirror galvanometer could be used if need be. When used to make temperature readings, a metal is heated in the tube electric furnace, and the heat is measured by the effect given by a small thermo-electric couple, so that the swing of the galvanometer due to the thermo-electric effect shows the temperature at which

(Continued on Page 226)

Inventions

By G. L. Edwardson.

YOUNG man, has it ever occurred to you that one of the surest roads to fame and fortune, and one of the shortest, too, is that offered by inventions? Now there is no lack of inventive genius; there never was so many clever people in America as there are today, but somehow or other their energies are not always applied in the right direction, and in consequence they fail. It is just the old story of eyes and no eyes; you cannot see what is wanted.

Has your observation ever been courted by the plumber laboriously pouring melted lead over a pipe joint and smoothing it down with a leather pad? Can you not think of a way to join those pipes cold, and do it quickly and thoroughly? If you can there is a fortune waiting for you.

And there is a nice easy little invention guaranteed to bring in thousands; just a simple and effective means of fastening panes in window frames. Surely it is a slur on the inventive genius of the age that we should have to resort to putty in this enlightened twentieth century.

There is also the parlor carpet. Have you ever thought what an unsanitary institution that carpet is? However diligent a housewife may be, she cannot keep it clean. The dust goes through the fibre and a whole world of microbes are safely entrenched in its soft pile. Now just try and think out a cheap and sanitary covering for floors, soft and warm to the feet, a finish pleasing to the eye, and you will have no need for an old-age pension.

Street railways suggest roads. The wealth of a Rockefeller is waiting for the inventor of a satisfactory paving material. At present the rule seems to hold that what is good for the wheels is bad for the hoofs, and vice versa. That is to say, where the road is smooth and the wheels run easily there is no grip for the hoofs, and where it is rough the vehicle is hard to draw.

Then there is the motor to consider. Propelled by the back wheels, it is bound to skid if the surface be at all greasy. What is wanted is a smooth, hard, absorbent surface, with at the same time a perfect grip. If this is too hard for you, try to invent a spike that could be quickly attached on a horse's shoes, by the driver, to give grip in time of frost.

There are scores of little things urgently wanted, which would certainly be used, and for the invention of which no technical knowledge is required. One of them is a really good can-opener, something that would cut the can open with one round sweep, without risk of amputating the fingers, or ruining the temper.

Then there is a crying need for an envelope that would serve for sending small articles through the mail. There is nothing of the kind in existence. And an envelope that could not be opened without detection would be hailed with wild enthusiasm by lovers and all those whom circumstances have placed at the mercy of inquisitive landladies.

The bottle that cannot be refilled is still wanted. There are several on the market, it is true, but the right one is yet to put in an appearance. And how about a shoe and glove fastener? Think how much time you spend lacing your shoes, and how annoying it is when the lace breaks, and you know that you have missed your morning train in consequence of the delay caused. A neat, quick, and simple little device is wanted to fill this want, one that would cost but little to adjust, and the income from this invention would compare with the royalties of a king.

Untold riches await the young mechanic who will bring into the world a non-puncturable automobile tire. Last year's output of automobile tires have been estimated at $14,000,000. The cost of the average automobile tire is $75.00. A substitute tire embodying practically all of the comfort essentials of the wind-inflated tire, but impregnable to the broken bottle,

tacks, etc. and other kindred foes of the pneumatic tire, is still eagerly sought for by every automobile manufacturer here and abroad.

Automobile manufacturers have spent fortunes upon fortunes in a vain endeavor to find a self-cranking, self-starting motor. So far their search has been without fruition. The skill and ingenuity of the automobile mechanic has been baffled by this motor. What a blessing it would be to the motorist to jump in his car, "throw on the high clutch" and speed away, instead of being compelled to get in front of his car, oftentimes in mud up to his ankles, to wrestle with the crank in order to produce the "spark." This invention alone, aside from bringing in the wealth of a Croesus, would invite encomiums and decorations from the foreign powers in bushels.

The flying machine man wants a more powerful engine. He says that when he gets his speed up to a hundred miles an hour, he will not care "a fig for the wind," and will travel as independent of it as if his craft were a railroad train that took no cognizance of winds.

The electrician considers wire a nuisance. He says if men are able to transmit signals through the air and impel machinery which will discharge a dynamite blast, there is no reason why some one should not find a method of transmitting electrical power through the air. He believes when once man understands electricity aright he will get much more out of it than he does now, and that the most wonderful things in electricity are yet to be discovered.

The chemist admits there are still unsolved problems in his field. A cabbage plant, a tomato plant, a beet, a rose, and a potato grow side by side in a garden. They are all in the same soil and amid the same surroundings, yet each grows differently and after its own kind. Here is the secret of life. Chemical change is the beginning of life and its support thereafter. Once the chemist penetrates that mystery, he has solved a thousand problems. The molecule of hydrogen is twice as large as its atom, yet it is so small that 50,000,000 of them, are needed to make an inch in length when placed in a row. Chemistry is tired of having the atom continue as nothing more than a scientific abstraction. It wants to see atoms and feel them, figuratively speaking. Put salt into water and no solid is visible. No one knows what becomes of it, but the chemist is proceeding on the theory that it is dissolved into little particles highly charged with electricity, called ions. Latterly the chemists have had glimpses of these ions which promise great future results.

The solution of the problem of fuel supply is one which will call for the deepest thought of genius. Although today the coal mined in the United States in a single year will do as much work as the whole human race could do in many years, the methods of using it for heat and power are tremendously wasteful. The energy in a pound of anthracite is equivalent to that expended by a hod carrier in a day's work of ten hours. The portion of the energy utilized is ordinarily less than the hod carrier would expend in fifteen minutes of work. A piece of coal weighing less than two pounds has as much power in it as a horse expends from pulling a plow from sun to sun. If all the energy of the coal were utilized, it would require only 300 tons of coal to drive a large steamer across the Atlantic. It may be that the experiments of making electricity direct from coal will solve the problem. Or perhaps a perfect combustion engine will do it. Either one of these things is possible.

But suppose none of them work out and the present wasteful methods of coal-mining and use finally exhaust the coal supply? Will we then be deprived of the necessarily abundant supply of motive power? The inventor already has answered this question by bringing out a solar engine. It needs only cloudless skies and hot climates for its successful operation.

With solar engines to develop the wasted sunshine of desert regions, two billion horsepower a day—enough to turn every wheel in the world will be generated.

Thus mankind may return again to the desert and there rear a civilization of undreamed-of grandeur. With di-

rect solar heat to drive his factories, to irrigate his land and to move his commerce, he could also utilize it to heat his factory, theatre and house. With only a minimum of clothing required and all necessary heat for cooking purposes supplied, an imaginative mind can picture the possibilities of such a civilization. In that day men will look back upon us and marvel at our using coal, just as we marvel at those German professors who gravely declared some eighty years ago that everybody who rode on railroad trains or were passed by them would go crazy because of the fast motion.

Such speed as the German professors were thinking of would scarcely exceed that of a slow freight today, and yet the railroaders think we need to double the speed of our fastest express trains. They admit that such speed cannot be attained with the present reciprocating counter-balanced locomotive; that it would pound both itself and the road-bed to pieces. But they say with a perfect rotary engine and an ideal road-bed, they could carry passengers from Washington to New York more quickly than they do from Philadelphia to New York today, and that the trip from New York to Chicago could be made between lunch and dinner time.

Nitrogen, when applied to the soil in proper quantities, possesses the almost magical power of making four blades of grass grow where one grew before. It is one of the most plentiful things in the world, existing in incalculable quantities in free air, but it comes down only with the lightning stroke, and the rain drop, and then in insufficient quantities.

So it is now being extracted from the air by electro-mechanical methods. The inventor who will find a cheap method of extracting it will make the United States able to support a population of 300,000,000 people more advantageously than it now supports 100,000,000.

The properties of that latest and greatest of the discovered elements—radium—are so wonderful as to beggar description. A ton of it would heat and light a palace through thousands of generations, losing not more than an ounce of weight or energy in a million years. Sir J. J. Thompson before the Royal Institute of England, not long ago, attempted to describe some of its powers. He declared that if a man could use it in war he might hurl projectiles as big as houses with a velocity a thousand times greater than that of the finest projectile military science has yet produced. Flour-worm larvæ have been made to live three times as long as their natural span of life, both as larva and as moth. It was as if a boy had been made to live more than two hundred years and still retained his youth. Applications of radium rays have made monsters out of tadpoles and have artificially fertilized the eggs of the sea urchin. Radium is so elusive that it is worth three thousand times its weight in gold. Yet indications are that it is plentiful, awaiting only the proper formula for its extraction.

The possibility of liquid air is no less interesting than that of radium. Already methods of making it cheaply have been attained. The gaseous air in a small room can be compressed into a bucketful of liquid air. Put a piece of steel into it, and although the liquid is cold enough to freeze mercury, it will burn the steel as easily as a pine knot burns in an open grate. Place the pailful of liquid air on ice and it will begin to boil. It will permit man to handle it as he pleases, except that it will not allow itself to be confined. Inclose it in an air-tight vessel and an explosion follows that would make an explosion of nitroglycerine seem like a baby fire-cracker in comparison. The man who will effectively harness liquid air may work even more of a transformation in human existence than did those who gave us our modern application of electricity.

One scarcely can realize how rapidly the tide of invention is rising in the world today. The late Prof. Langley once declared he had archæological evidence that it took mankind thousands of years to learn to sharpen his stone-ax by rubbing it on another stone. Certain it is that Andrew Jackson had no better means of communicating the victory of New Orleans to Washington than that used in the days of Abraham and Xerxes. The octo-

(Continued on Page 226)

Berlin Letter.

A Novel Generator of Electric Waves.

THE electric waves generated for the purposes of wireless telegraphy and telephony by electric sparks or arcs are obviously of a limited energy and imperfect constance. Endeavors have therefore been made to generate such waves immediately in electrical machines the output of which —similarly to ordinary dynamos— could be increased at will by augmenting their dimensions. However, in the designing of high-frequency alternators, it is found very difficult to ensure at the same time a high output.

Dr. Rudolf Goldschmidt of Darmstadt has invented a novel process for simultaneously insuring high frequencies and high outputs. His machine is designed on the lines of a 3-phase in-

duction motor, the slip-rings of the rotor being electrically connected with the terminals of the stator. The stator is fed with direct current from a battery (protected by a throttling coil against alternate currents) and the rotor is made to rotate at a certain speed. The rotor and stator are separated by condensers pervious exclusively to alternate currents so the direct current only flows through the stator. The currents (of a frequency corresponding to the speed of rotation) which are then produced in the rotor will pass through the condensers into the stator coils, there producing a 3-phase field which in its turn rotates at the same speed as the rotor but in an opposite direction, thus producing in the rotor currents of twice the frequency corresponding to the speed of rotation, which in their turn pass into the stator, setting up currents of a triple frequency and so forth. The automatic transformation, theoretically speaking, thus results in the production of infinitely high frequencies.

The lower frequencies which are not utilized are made to flow through short-circuited conductors and only the frequency which is actually to be used is supplied to the effective resistance (antenna). There is then inside the machine a conversion from low to higher frequencies at a very considerable efficiency, which increases up to a given limit as the frequency augments, any increase in frequency being attended by a conversion of new amounts of mechanical into electrical energy.

The stator and rotor are comparable to a stationary and rotating mirror, respectively, between which the electrical energy is thrown to and fro in a similar manner to light rays. Reflection is attended by an increase in frequency (owing to the relative motion of the mirrors), being the more perfect as the mirrors themselves absorb less energy, viz., as the vibratory circuits are more free from damping. The inventor therefore suggests the name of "reflection generator" for his machine.

Fig. 1 represents the first machine of this type which has for some time been in operation at Messrs. C. Lorenz A.—G.'s radio-telegraphic station, at Eberswalde, near Berlin. This machine supplies 12.5 kw with a wave length of 10,000 meters while 8-10 kw. are still obtainable with waves of 5,000 meters. No difficulty is experienced in designing machines of 60, 80 kw. and more and in generating waves of 3,000 meters. The efficiency with a wave length of 10,000 meters is about 80 per cent.

A special advantage of this wave generator is, its allowing a great number of frequencies to be derived by a simple change of connections. Any finer gradation in wave length can be effected, according to a special process.

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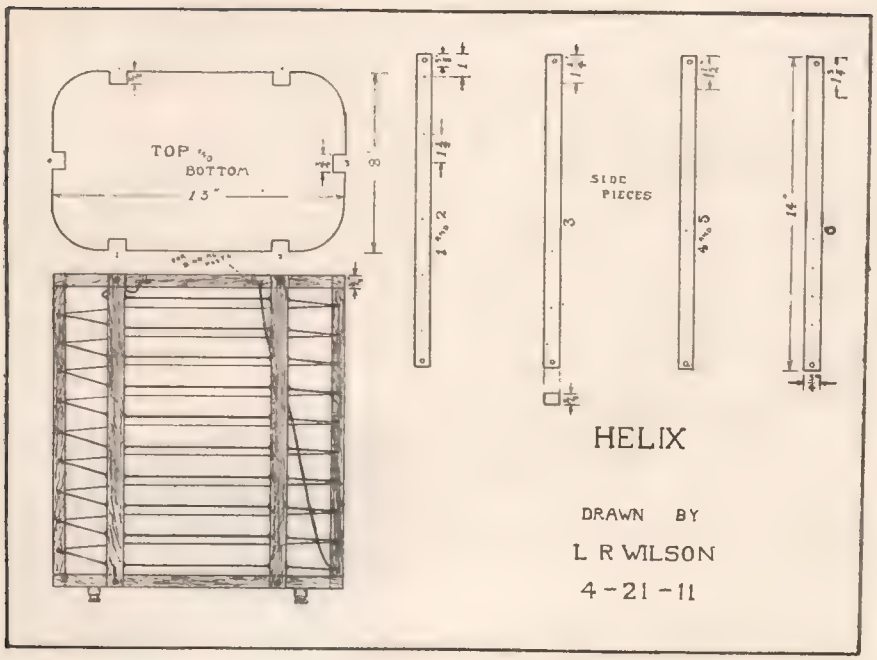
A Helix Design

By L. R. Wilson.



An attractive and efficient helix may be made in a different and more convenient shape than the ordinary circular shape.

Prepare two pieces of hard wood 8x 13x⅝ inch as seen in the figure. Also six pieces 14x¾x⅝ inch. Number these pieces from 1 to 6, also number the grooves in the top and bottom in order, so that the right piece may be placed in the proper groove when completed.

Take stick No. 1, one inch from the end bore a three-sixteenths inch hole, one and one-quarter inch from this bore a second, and so on until there are ten such holes. Do the same for No. 2. Now take No. 3, one and one-quarter inch from the end bore the same sized hole as before, and one and one-quarter inch from this bore another, until there are ten holes. With Nos. 4 and 5, start the first hole one and one-half inch from the end and hole every one, one and one-quarter inch. With No. 6 start one and three-quarter inch from the end.

Now get about five feet of hard rubber tubing three-sixteenths inch O. D. and one-eighth inch I. D. (This can be obtained from the E. I. Co.) Cut this tubing into seven-eighth inch lengths, tightly fitting a piece into every hole. Put the frame together with wood screws. Four insulators may be used for feet, and two good size binding posts should be placed in the top.

Purchase about 30 feet of aluminum or other helix wire, a little less than one-eighth inch in diameter. This should be wound through the tubing connecting each end to a binding post. A spark gap placed on the top helps the appearance of the instrument decidedly.

As so many clips have already been described I will leave them to the choice of the reader.

THE PRACTICAL ELECTRICIAN.

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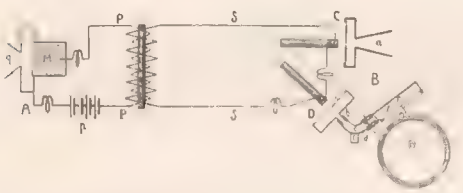
On top of the nitric acid a layer about 1 inch in thickness of crude oil is poured. This keeps down the fumes to a great extent although it does not do away with same altogether.

(*To be Continued.*)

A Novel Tele-Phonograph

By Dr. Alfred Gradenwitz.

SUCCESSFUL tests have been recently made on the telephone lines of the Italian state, of a simple arrangement devised by Pierluigi Perrotti for recording telephone talk. The receiving post comprises in addition to the telephone used for listening to the communication, another telephone, the mouthpiece of which terminates in a flexible tube connected with the mica plate of the phonograph membrane which accordingly is separated from the iron membrane of the microphone by a small amount of air enclosed on all sides. The mica plate carries the usual sapphire style exerting a certain pressure on the phonograph cylinder.



All vibrations of the telephone membrane are thus faithfully communicated to the phonograph membrane which inscribes them in the wax of the cylinder.

In spite of the remarkable sensitiveness of this arrangement it is recommended to talk somewhat more loudly than otherwise in telephoning (with about the same intensity as in dictating), while keeping the current intensity slightly above the figure usual in ordinary telephone plants.

By displacing a small lever, the clockwork of the phonograph is started and stopped at any moment, thus allowing a conversation to be recorded partly or integrally. If then the recording membrane be replaced by a reproduction membrane and sound funnel, a phonographic reproduction of the telephone talk can be insured at any time and at any place.

Apart from leaving word to telephone subscribers happening to be absent, this apparatus allows telephone communication to be endowed with the same official, binding character as records in writing. The inventor also suggests its use for despatching news in the form of phonograph records to be transmitted from the telephone exchange to any subscriber desired. Moreover, it would seem to lend itself as some sort of long-distance dictaphone, for dictating correspondence over a telephone line. It is so simple and substantial in construction as to be handled by any layman.

It is even thought possible that the use of this new telephonograph may be preferred in certain cases to telegraph communication, allowing as it does a characteristic picture of the correspondent's voice to be transmitted in the place of some conventional signs. It moreover enables despatches to be kept secret without the aid of any code and affords the possibility of repeating as often as desired any telephone conversation that may have been caught but imperfectly.

CUT WIRELESS TOLLS BY USING BIBLE.

A unique method of reducing the cost of wireless messages on steamships was resorted to by Mr. and Mrs. Edwards, who were crossing the ocean on different liners. Edwards is purser of the Baltic, and his wife arrived here on the steamer Minnewaska, a day after the Baltic docked.

Mr. Edwards started the wireless game by sending a message reading:

"Third epistle, John 13-14."

Turning to the Bible, Mrs. Edwards translated:

"13. I had many things to write, but I will not with ink and pen write upon thee.

"14. But I trust I may shortly see thee, and we shall speak face to face. Peace be to thee. Our friends salute thee. Greet the friends by name."

Mrs. Edwards replied:

"I. Timothy, 5-23," which her husband translated as follows:

"Drink no longer water, but use a little wine for thy stomach's sake, and thine often infirmities."

Paris Letter

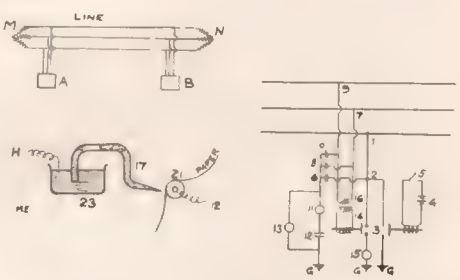
Wireless on Aeroplane.

WIRELESS upon airships and aeroplanes is quite the order of the day in France. The annual naval manoeuvres which are to be held in September in the Mediterranean will be not only remarkable for the fact that 5 dreadnaughts will take part for the first time, together with the new submarines, but the Navy has just decided to send four aeroplanes which will act as scouts during the exercises. They will be piloted by the navy offi-

cers who are trained as aviators, and no doubt one of these will be Ensign Conneau, the winner of the Paris-Rome aeroplane event. It is quite probable that the aeroplanes will carry wireless apparatus, and by that time there will have been made a very good progress. One of the experimenters is M. Ancel, and we had occasion to see some very interesting apparatus which he is making. This, we expect to describe more fully, but we may mention that he already made some very good experiments with a Farman aeroplane and was able to signal at 10 miles. In our present view is shown a recent wireless outfit mounted on board a French aeroplane. On the left is a reel for 500 feet of wire which is unrolled to form the aerial, and on the left is a compact set of apparatus for signaling. The telephones are hung up in the center so that they are always at hand for use.

Signals Over City Mains.

The following method can be used for sending signals over city mains or any other central station wires without disturbing the main current. The 3-phase system is taken as a basis, with the three mains running between the central station M and a second point N. At A is the first post and B the second. Each post has the connections shown here. First, for sending signals we use a circuit 1, 2, 3, G taken off one line wire, with proper resistance and self induction coils, also the key 3 which is worked by hand or by the relay device 4, 5. Second, for receiving, we have three circuits 1, 2, 6; 7, 8; and 9, 10 coming off the line. The neutral point is at 8. There is also a circuit 8, 11, 12, G between the neutral point and ground. In all these cases, the condensers 6, 8, 11, 12 limit the current. At 11 is the receiver proper, and it is acted on by the varying current in 8, 11, 12, G or by the difference of potential between 8 and ground. In the latter case an electro-

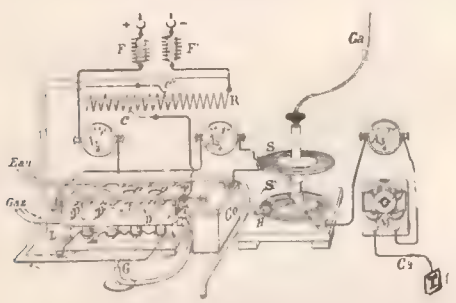


static receiver is used. One such device is a modified siphon recorder. An ink vessel 23 has the pointed siphon tube 17 lying next the paper strip on the drum 21. The vessel is connected to point 8 and the drum to condenser 12, so that when the difference of potential rises above that of the earth, the ink is sprayed out and gives a dot or dash on the paper. This device is different from the usual recorder, as the tube is always fixed. The circuit 1, 2, 15, G is used for receiving when the line is cut between the central station and the post, and an ordinary telegraph apparatus and call bell is used here. This circuit is put on by the automatic switch 14 when the current fails, or else by hand.

Arc Apparatus.

At the recent exhibition of the Physical Society of Paris we observed

one of the newest arc apparatus for wireless telephony. It is constructed by the Ducretet firm on the Duddell arc principle, but has many improvements which result from practice. The device uses several arcs in series, and from 1 to 4 arcs can be coupled in as desired, according to the current which is used. A good gas circulation is kept up in the enclosing box. The arcs are started automatically by means of the electromagnets E noticed below the box. Current comes to these by a shunt from the main current. On the screw cover are sight holes for the arcs, as well as a safety valve. The number of arcs varies with the voltage which is used. The main current passes through two self-induction coils F F¹, a rheostat with double slide, and an ammeter A_1. The arcs are formed between water-cooled metal cylinders D and carbons of special make. Each arc is regulated separately from the outside by the top adjustment buttons. A 4-way switch puts the voltmeter on any one of the arcs. The other circuit uses an adjustable condenser



Co, a hot-wire ammeter A_2 and the primary coil S of the oscillation transformer, and different binding posts allow of varying the number of turns. Its height can be adjusted for various couplings, and a slide contact H on the secondary gives a continuous variation so as to obtain a very close tuning. At M is a set of microphones, with four mounted together upon a common mouthpiece, and these are of the Gaillard-Ducretet loud-speaking type which has already proved so successful in increasing the sound. A multiple switch serves to couple the microphones in series or parallel in the best way, or to short circuit them so as to give less resistance in the aerial. The hot-wire ammeter A_3 is mounted in series so as to observe the tuning.

INVENTIONS.

(Continued from Page 221)

genarian of today has seen more human progress than all the generations since Adam. He has seen man multiply his powers in vast proportions; add infinitely to his well-being, and subtract wonderfully from his limitations.

Standing on the acropolis of the greatest eighty years in all history, and peering from that eminence into the future, the inventors today tell us that the Golden Age has not yet dawned; that the only Golden Age they see is the one of realizing that illimitable possibilities are yet ahead, and that we are seemingly as far removed from the Ultima Thule of what genius may accomplish as we were years ago.

They believe that each invention opens new fields of possibilities, and that no man living can predict the end. It is a matter of American pride that her genius has perfected a majority of the race-benefiting inventions of modern times, and of equal gratification that American inventors are still in the vanguard of human achievement.

NEW INSTRUMENT.

(Continued from Page 218)

the metal is heated. With a platinum-rhodium thermo-couple, using a long galvanometer scale of 4 feet 6 inches, the zero point on the scale corresponds to 0 degrees C. (freezing point of water) and the full scale reading corresponds to 1,500 degrees C. Thus a very wide range of heating is secured. By altering the connections on the resistance box a shorter range can be used, in which a temperature range of 0 to 1000 degrees C. is obtained on the full length of the drum, or 20 inches. In using the long scale care must be taken to make the adjustments so that the working region of the light beam always comes over the drum.

It will be seen that the present instrument enables accurate and open curves to be traced in a very short time and with very little trouble, and the apparatus is a comparatively inexpensive one. Most workers already have the above instruments, with the exception of the curve tracer.

Strengthening Wireless Signals

By Ellery W. Stone.

A SHORT time ago, following an article which appeared in the March, 1910, edition of "Modern Electrics," I installed a static kickback preventer in my wireless equipment. This kick-back preventer consisted of the condenser described by the author of the article previously mentioned. One side of the condenser was grounded. Half of the other side was attached to one of the mains, and the other half to the other main.

The condenser did its work perfectly as a kick-back preventer. The purpose of this article, however, is not to describe the merits of the condenser while fulfilling its intended purpose, but is to give the amateur a short account of the extra use to which I put the condenser.

The condenser was permanently grounded, and could be thrown onto the mains by means of a D. P. switch. I found that when the condenser was in circuit, while receiving, certain stations came in louder than usual, while others were cut down considerably.

After long experimenting, I found that with local stations, i. e., within a radius of 25 miles, of comparatively short wave-length, the strength of the incoming signals was increased three to four-fold. With local stations of fairly long wave-length, the strength of the incoming signals was decreased to a considerable extent, when the condenser was in circuit.

With stations some distance away, the situation was slightly altered. Signals coming from these stations were greatly increased by throwing in the condenser, no matter whether the wave-length was long or short.

It might be well to add that all tuning was done with a loose coupler. The adjustment of the secondary was not altered when the condenser was thrown onto the mains, but the primary slide was adjusted as if for a much shorter wave. It would seem that the wave-length of my station was increased, since less of the primary was used to tune to the desired wave-length. But if this were so, why would not the extra wave-length be advantageous in tuning in long wave-length signals coming from local stations, instead of being a hindrance? Whatever the answer is, the fact remains that the condenser certainly increased the intensity of the greater per cent. of incoming signals.

One can easily see what an enormous capacity is added to a receiving set by the use of the condenser, so attached to the mains.

Therefore, I would advise all amateurs to install static kick-back preventers, if for no other reason than to increase the efficiency of their receiving sets, in which latter service, the condensers will give most excellent results.

W. D. H. S. WIRELESS ASSOCIATION.

On Feb. 10, 1911, a "Wireless Club" was formed at the West Division High School of Milwaukee. At that time the club was small and contained only ten charter members, being under the supervision of the physics teacher. As the club grew in members, the interest about the school grew, until on March 28, 1911, the association had about twenty-five members. It was then decided by the club to hold a definite election for the benefit of having a suitable president, vice-president, secretary, etc., and also to elect members to a construction committee, and a program committee. A special meeting was called and the following were elected to office of the "W. D. H. S. Wireless Club":

Officers—President, Walter Peter; vice-president, Arthur Riebe; secretary, Edwin Rauser; treasurer, Edwin Schmidt.

Construction Committee—Chairman, Harold Devendorf; 1st assistant, Merville Franklin; 2nd assistant, Marshall Geilfuss.

Program Committee—Chairman, Stanley Polecheck; 1st assistant, George Kestler; 2nd assistant, Alfred Perigo.

World Radio History

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EDITORIAL.

OUR series, "The Practical Electrician," by Prof. Weiler has met with such great approval that we have been induced to import a large quantity of Prof. Weiler's books, which, of course, are printed in German. This book is bound in dark green linen and comprises 708 pages and 570 beautiful illustrations. This is the Fifth Edition and covers the entire Electrical field in a thorough manner.

Most of the language is non-technical and the student and even the laymen will have little difficulty to thoroughly understand all the details. Even the student understanding no German will do well to procure one of these books as there are so many illustrations, so well executed that in most of the cases description is not necessary. There are a great many good formulae in this book also and the student understanding little German will not have much trouble to translate the good formulae by means of a good dictionary.

When we first started to translate Prof. Weiler's book, we, of course, did not intend to sell the German book but inasmuch as there has sprung up such a great demand for the book, we are now offering same as it will take upwards of a year to 18 months to completely translate it, as only about 10 pages can be translated in each number of Modern Electrics on account of lack of space.

Price of book is $4.50, by mail 20 cents extra.

In connection with this we would like to hear from our readers if they desire to have more "Practical Electrician" and less Experimental Department, and we request readers to send us a postal card advising us as to their views and we will then have a popular vote.

We are of course, always anxious to please our readers but in order to exactly know just what is wanted most, we must be guided by them and this can only be done by having a large number write us their views.

We would therefore urge everybody who has the welfare of Modern Electrics at heart to send us a postal card at once, what is wanted most. This will guide us quite a good deal.

Ralph 124C 41 +

(Continued.)

By H. Gernsback.

SYNOPSIS OF PRECEDING INSTALLMENTS

Ralph 124C 41+ living in New York in the year 2060 while in conversation with a friend at his Telephot, an instrument enabling one to see at a distance, is cut off from his friend and by mistake is connected with a young lady in Switzerland, thus making her acquaintance by Telephot.

The weather engineers in Switzerland who control the weather decided to strike against the Government and turned on the high depression of their Meteoro-Towers, thereby snowing in a large district. An avalanche threatens to sweep away the house in which the young Swiss lady, Miss 212B 423, lives and she appeals to the great American inventor, Ralph 124C 41+, to save her, which he promptly does by melting the avalanche by directed wireless energy from his New York laboratory.

The inventor on the same afternoon is given an ovation by distance, in which the Telephot plays a great part. Afterwards he reads a "newspaper," the size of a postage stamp, and "writes" a lecture by means of the Menograph, an instrument by means of which words are made to appear on a paper tape by impulses from the brain acting on the apparatus. During the night his head is connected electrically to the Hypnobioscope, an instrument by means of which words and sentences are transmitted directly to the brain while one sleeps, in such a manner that everything can be remembered the next morning.

THE next day Ralph 124C 41, engrossed in deep research work, was interrupted by Peter.

The great inventor, irritated by the intrusion of his old servant, said a few unkind things and quite lost his temper.

"But," Peter interjected, "won't you let me explain that the lady whom you——"

"Never mind your lady," was the angry reply, "and now please disappear, and quickly at that!"

With that he pressed a button nearby, an electromagnet acted and the heavy plate glass door slid down from above, almost brushing Peter's displeased face.

Ralph 124C 41 returned to the large glass box over which he had been working and in which one could see through greenish vapors a medium-size dog, across whose heart was strapped a flat glass box, filled with a metal-like substance.

The substance in the box was Radium-K. Radium, which had been known for centuries, had the curious property of giving out heat for thousands of years without disintegrating and without apparently obtaining energy from outside.

In 2009 the great Frenchman Anatole M610 B9 found that Radium obtained all its energy from the ether of space and he proved that Radium was one of the few substances having a very strong affinity for the ether. Radium he found attracts the ether violently and the latter surging back and forward through the Radium becomes charged electrically and presents all the other well known phenomena.

Anatole M610 B9 compares the action of Radium on the ether with that of a magnet acting upon a piece of iron. He proved his theory by examining a piece of pure metallic Radium in an etherless space, whereupon it lost all its characteristics and acted like a piece of ordinary metal.

Radium-K, as used by 124C 41, was not pure Radium, but an alloy composed of Radium and Argonium. This alloy exhibited all the usual phenomena of pure Radium and produced a large amount of heat, but it did not give rise to burns on animal tissue, and could be handled freely and without danger.

The dog lying in the glass box had been "dead" for three years. Just three years ago, in the presence of twenty professors from all over the globe, Ralph 124C 41 had exhibited a live dog and had proceeded to drain off *all* his blood till the dog was quite dead and his heart had stopped beating. Thereupon he had refilled the empty blood vessels of the animal with a weak solution of Radium-K bromide, and the

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large artery through which the solution was pumped into the body had been closed.

The flat box containing Radium-K was then strapped over the dog's heart and he was placed in the large glass case. The latter was filled with *Permagatol,* a green gas having the peculiar property of preserving animal tissue permanently and indefinitely. The purpose of the box containing Radium-K was to keep the temperature of the dog's body at an even point and the substance did this admirably.

After the glass case was completely filled with gas, the glass cover was sealed in such a manner that it was impossible to open the case without breaking the seals. The professors had agreed to return after three years to witness the opening of the box, whereupon they departed.

There were several delicate instruments inside of the box and these were connected by means of wires to recording instruments on the side of the box, and 124C 41 inspected these twice each day. Throughout the three years the "dead" dog behaved admirably. He had never stirred a muscle, his temperature had never changed 1/100 of a degree and his respiratory functions had never showed signs of any life. To all intents and purposes the dog was totally dead.

124C 41 had taken it upon himself to prove that a dead body perfectly conserved in each and all respects could be revived by proper means; and this afternoon, the three years having elapsed, the professors would assemble to witness the close of the great test, which had kept the press of the world busy with speculations for years. Would he succeed? Had he not attempted the impossible? Was he not attacking nature on her own sacred ground?

124C 41 evidently knew what he was doing. He busied himself about the box and presently began by pumping out the Permagatol from the box till all the green vapors had disappeared. With infinite care he then introduced a small quantity of oxygen into the box and the recording instruments for the respiratory functions immediately indicated that the oxygen in the dog's lungs had taken the desired effect.

As this was all that could be done for the moment 124C 41 summoned Peter.

"Sir," announced the servant, "Miss 212B 423, the young lady you saved yesterday, has just arrived with her father; both are in the reception room, anxious to see you."

"Oh, Oh, really!" the great inventor exclaimed, beaming with pleasure, "I shall be down immediately!"

He at once proceeded to take off his laboratory coat and donned his house coat. He then stepped over to the dresser and brought face to face with the mirror he could not help noticing that his face was slightly flushed, an uncommon thing for him, the cold man of science.

"Aha," he whistled, "Ralph, take care of yourself, this is getting serious!"

Nevertheless, he took great pains to brush his hair with unusual care and to arrange his tie with an exactitude really ridiculous for him, so he thought. With a springy step that surprised him he stepped over to the electromagnetic elevator and the car slid noiselessly down to the reception room.

As he walked into the spacious room, he suddenly became aware that he was uncommonly awkward and that the room so familiar to him had assumed a weird strangeness.

Seated near one of the windows he saw Miss 212B 423 and next to her he perceived her father; both of them he recognized immediately, as the faces of both, which he had seen yesterday only through the telephot, were impressed upon his memory indelibly.

As soon as Miss 212B 423 caught sight of 124C 41, she jumped up to meet him, and taking hold of his hands proceeded to bestow upon him expressions of her appreciation and thankfulness for having saved her life from that terrible avalanche. In this she was joined by her father, who with tears in his eyes thanked the great scientist profoundly time and again and shook his hands for a long time.

124C 41 noticed that both spoke English perfectly and, as soon as he had recovered from the embarrassment and discomfiture in which he was placed by this vote of thanks, commented upon this fact.

"Why," Miss 212B 423 laughed, "when I spoke French to you yesterday I assumed that you spoke it too, but I suppose you must have used the language-rectifier, so I was none the wiser. When we came your butler informed us that you

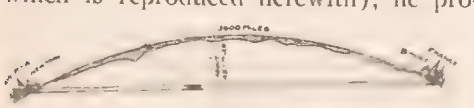
did not speak French, so you see we have the advantage of you!"

"So I perceive," 124C 41 laughed in turn, "and now if you wish to incur my gratitude I must ask both of you not to refer to yesterday's incident any more. But may I ask how you arrived here so early? The afternoon transatlantic aeroliner is not due as yet, and it can hardly be twenty-four hours since you left Switzerland."

"Your question is fully justified," replied Mr. 212B 423. "We have the honor to be the first passengers to arrive by means of the new *Subatlantic Tube*. As you doubtless are aware, the regular passenger service opens next week, but being one of the consulting engineers of the new electromagnetic tube, my daughter and I were permitted to make the first trip westward. It was a risk for both of us, inasmuch as some small portions of the tube are not entirely completed, but we made the trip with perfect safety, and took the chance personally to thank you as quickly as the latest conveyance would bring us to you."

"A thousand thanks," stammered 124C 41, looking intently at Miss 212B 423, "but it was out of all reason to risk both your lives, in an un-tested tube, in order to arrive here a few hours earlier; I would have been just as well satisfied to see you a little later, but"—and now the scientist spoke out of him, "tell me all about the new tube!"

"As you of course know," Mr. 212B 423 resumed, "the new subatlantic tube runs in a perfectly straight line between New York and Brest, in France. If the tube were to run straight along the bottom of the ocean the distance between the two points would be from 3700 to 3800 miles on account of the curvature of the earth. For this reason as you are doubtless aware the tube was pushed *straight through the earth*, thereby making the distance only 3500 miles, instead of 3700 to 3800 miles. You can see this better by examining the chart I brought with me," and unfolding a plan, (part of which is reproduced herewith), he pro-



ceeded to show to the great inventor the finer points of the tube construction. "The greatest trouble," he continued, "our engineers experienced at about the middle part of the tube; this point is 450 miles nearer the center of the earth and the heat became very marked. It became necessary to install large liquid-air plants along several points of the tube to reduce the heat, and now while you ride through the tube no heat is experienced by the passengers.

"We boarded the spacious steel car, which resembles a thick cigar, at Brest last night at twelve o'clock, midnight, and arrived at the New York terminal at twelve o'clock noon to-day. There was only one stop, a few hundred miles out from Brest, on account of several short-circuited electromagnets.

"You know, of course, that there are no wheels to the tube car and that it is propelled by magnetism only. At each three hundred feet is stationed a powerful tubular electromagnet, about thirty feet long, through which the tube car passes. Each electromagnet exerts a tremendous pull upon the car three hundred feet away, this being the only steel object, and the car rushes to the electromagnet with a frightful speed. When the car is only two feet away from this electromagnet, the current is switched off automatically by the car itself, the latter plunging through the open space of the magnet coil, only to be influenced now by the next electromagnet, three hundred feet distant.

"The momentum acquired by the pull of the former electromagnet propels the car with ever-increasing speed, and by the time the car has passed through twenty-five electromagnets it has reached the respectable speed of three hundred miles per hour. It then continues its speed at a steady pace till the end of the journey.

"As the car is held suspended entirely by magnetism, there is practically no friction whatever, as there are no wheels nor rails. The only friction is from the air, and in order not to heat up the car through this friction, the car is equipped with a double wall, the space between the inner and outer walls being filled with liquid air constantly. Consequently the temperature inside of the car is quite comfortable. Once inside the car, we went to bed and slept as soundly as in our swinging beds at home. There were no shocks, no noise, no rocking,

all in all the trip was delightful, and I must pronounce it a decided success!"

"Quite interesting, I must say," 124C 41 remarked, "and how did you enjoy the trip, Miss 212B 423?"

"Oh, it was *so* exciting and *so* delightful, *so* smooth and *so* fast. Really, the trip was over too soon!"

She then went on to explain the details of the journey and 124C 41 watched her with increasing interest.

Here at last was a girl who interested him. He, who had long since given up hope of making the acquaintance of a girl who would excite more than passing interest in him, began to think that he had found her at last.

Alice 212B 423 was tall and lithe. She carried a wonderful head on queenly shoulders, and her Greek masterfully chiseled profile, crowned with a mass of black curly hair, would command attention everywhere.

Her sparkling, black, vivacious eyes had an impenetrable depth, and when they did not dance mischievously, as was invariable when she laughed, a sorrowful expression would sometimes light up those deep-sea eyes—an expression that was quite in contrast with her general appearance. She was quite tall and carried herself with unusual grace; moreover she was quick in all her movements, and a trained eye would soon detect that she must be a great lover of out-door sport.

The more 124C 41 watched her, the more he knew that his search was ended and that here at last was a young woman worth his while. The afternoon having progressed, he invited father and daughter to be his guests for a few days. His invitation after some hesitation was finally accepted. He then summoned Peter to show the guests their rooms on the seventeenth floor of the tower, and before they ascended he invited them to be present in the laboratory at four that afternoon.

Promptly at four Ralph 124C 41 entered the laboratory, in which were already assembled the twenty professors from all over the world—who had returned after three years to witness the now famous "Dead-alive Dog" experiment—and a host of reporters. 124C 41 shook hands all around and then waited a few minutes for the appearance of Mr. and Miss 212B 423. They finally arrived and were welcomed heartily by the great inventor.

Everybody being seated, 124C 41 began with the following address:

"Ladies and Gentlemen: It affords me great pleasure to see again all the representatives of the various countries after a lapse of three years.

"As I explained three years ago to-day, I built up a theory that a well preserved animal, though dead to all intents and purposes, could be revived, or new life given to it, providing the body had not undergone decomposition and also providing that none of the organs had suffered in the least.

"I found that the rare gas Permagatol would conserve animal tissue and animal organs indefinitely, and this in conjunction with a weak solution of Radium-K bromide, mixed with antiseptic salts, would not allow any part of an animal body to undergo any change for long years.

"I also found that the body would have to be kept at a constant temperature and this was accomplished admirably by means of Radium-K alloy. I am now ready to prove my theory."

He then invited the professors to inspect the seals of the glass case containing the dog, and after the seals and closures had been found intact, the latter were broken and the glass cover of the case taken off.

A profound silence prevailed. Every one's nerves were on edge and most of those present found it difficult to remain seated.

Ralph 124C 41 with a cool and deliberate gesture freed the dog of his bandages and attachments and then placed him on an operating table in plain view of everyone.

There were two assistants, and things began to move rapidly. First the dead dog's artery was opened and the Radium-K bromide solution was drained off. On the table a young goat had been strapped, and in a very few seconds one of its arteries had been opened and connected to the dead dog's main artery. In less than a minute the dog's body was full of fresh warm blood and immediately efforts were made to bring the dog back to life.

Oxygen was freely administered and the heart was exercised with rhythmical

movements by means of an electrical vibratory apparatus.

At the same time one of the assistants had trained a vacuum tube on the dog's head and its cathode shot the powerful F-9-Rays into the dog's brain. These rays, which are known to be one of the most powerful brain stimulants, seemed to work wonders. No sooner had they been trained on the dog than he began to show weak signs of life. One of the hind legs was drawn up with a jerk as if in a fit. Then came a faint heave of the chest, followed by a weak attempt to breathe.

For a few minutes following the dog gave no signs of life whatsoever, then all at once the body seemed to contract and a shiver ran through it from head to tail. A deep breathing followed, and for the first time the animal opened its eyes as if awakening from a long sleep.

From that moment on the dog made rapid progress, and at half past five—one hour and ten minutes after the dog had been lifted out of the glass case—the animal was able to lie on its paws and to lick up some milk with surprising avidity.

At that moment the audience, who for almost thirty minutes had stood up in their seats, burst out in wild applause, scaring the dog almost to death. Everyone wished to shake hands with Ralph 124C 41 and he was visibly moved. He was the first man to give life to a dead body, dead for years; he had conquered nature, achieved the impossible; he had opened a new era for suffering humanity, for what could be achieved with a dog could be achieved with a human being.

It would now be possible for human bodies to have life suspended for centuries, perhaps, and live again after the world had moved on and new generations had appeared. Truly, it was wonderful.

As he descended in a dazed condition to his room a few minutes later, he could not forget a certain young lady, who with tears in her exquisite big black eyes had taken his hand into hers and with a vibrating voice full of emotion had said, "Oh you wonderful, marvelous being!"

(To be Continued.)

This story started in the April issue. Back issues by mail 10 cents each.

"WIRELESS INSTITUTE."

H. Winfield Secor, Associate Member Wireless Institute.

At the June meeting of the Institute of Wireless Engineers, held at Fayerweather Hall, Columbia University, Mr. R. H. Marriot presented a paper covering the new wireless ship bill, to be put into effect on July 1, 1911, which compels all vessels carrying passengers, and travelling over a greater distance than 100 miles to be equipped with wireless apparatus, capable of covering a distance of at least 100 miles under all conditions and times.

An important point brought out by Mr. Marriot, in discussion, was the probability of a small ship equipped with ordinary apparatus, communicating a distance of 100 miles, under all conditions, especially with severe interference caused by several large stations operating in the near vicinity. It seems more practical to demand a guaranteed working radius at all times of 50 miles.

This paper was of particular importance to wireless amateurs, as the fact was disclosed that there will be a great demand for operators, but the operator has got to do more than punch a Morse key. He must be, in fact, a wireless expert to pass the Government examinations, which, among other things, require a person of good education; reputable character; an operating speed of 15 words per minute; familiarity with all types of wireless apparatus, their functions and use; a thorough understanding of close and loose-coupled circuits; tuning; changing sending capacities and inductances, with respect to variation in wave length; a general knowledge of electrical laws and phenomena; the repair of all instruments, etc.

The examinations include questions on both radio-telegraphy and radiophony, and standard apparatus in both fields, as far as standardized up to the present time.

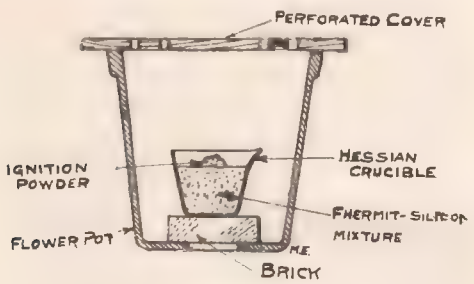
For the reason that the supply of competent professional operators will undoubtedly be far short of the demand, it is most likely that the amateurs who aspire to commercial wireless duty, will get plenty of opportunity, but they must be thoroughly posted on wireless matters.

This department has been started with the idea to encourage the experimenter to bring out new ideas. Every reader is welcome to contribute to this department, and new ideas will be welcomed by the Editors. WHEN SENDING IN CONTRIBUTIONS IT IS NECESSARY THAT ONLY ONE SIDE OF THE SHEET IS USED. SKETCH MUST INVARIABLY BE ON A SEPARATE SHEET NOT IN THE TEXT. The description must be as short as possible. Good sketches are not required, as our art department will work out rough sketches submitted from contributors. IT IS THEREFORE NOT NECESSARY FOR CONTRIBUTORS TO SPEND MUCH TIME IN SKETCHING VARIOUS IDEAS. When sending contributions enclose return postage if manuscript is to be returned if not used. ALL CONTRIBUTIONS APPEARING IN THIS DEPARTMENT ARE PAID FOR ON PUBLICATION.

FIRST PRIZE TWO DOLLARS.

HOW TO MAKE FERRO SILICON

No doubt there are many amateurs who would like to experiment with the ferro-silicon detector, and who find the commercial alloy—when they can procure any at all—very unsatisfactory. Here is a cheap way to make a very pure variety—carbon free, and best of all, you can vary the amount of silicon present anywhere from 5



per cent. to 95 per cent. until you find an alloy that works best.

Procure some Hessian crucibles about 3x2 inches. (These cost but a few cents each.) Next get about one-half pound black thermit (at about 50c pound) and about one-eighth pound thermit ignition powder (at about 50c per one-half pound). Any large dealer in chemicals carries these. The amounts I suggest will do for a large number of experiments.

Make a mixture of the thermit and silicon (see formula below) mixing very well. Fill a crucible three-quarters full and put a tiny mound of ignition powder on top. Set the crucible on a piece of brick in a large flower-pot (see sketch) and cover loosely with a board having holes drilled through it to admit air. Lift the board, touch a long taper to the ignition powder and when the action is started drop the board on again, to keep in any stray sparks that fly out. The action is over in a minute but the crucible will remain white hot for a long time. After about five minutes pick it up with a pair of tongs and plunge under cold water. When cold break the crucible and you will find the alloy as a metallic button in the bottom surrounded by a black slag which can be thrown away.

To find out how much silicon to use, in order to make an alloy of a given per cent. silicon content, use the following equation:

$$x=\frac{Tp}{200}$$

Where x=am't of silicon (sought).
T=am't of thermit.
p=per cent. silicon to be in alloy.

For example—I want an alloy containing 30 per cent. silicon. I use 100 grams thermit.

$$x=\frac{100\times30}{200}=15 \text{ grams of silicon.}$$

The theoretical yield will be, one-half the weight of the thermit used, plus the weight of the silicon, or in the above case,

$\frac{100}{2}+15=65$ grams of Ferro-Silicon.

Contributed by

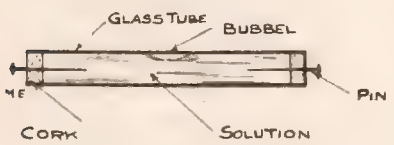
L. C. BYCK.

SECOND PRIZE ONE DOLLAR.

POLARITY INDICATOR.

I wish to give you a description of a very simple and efficient polarity indicator. All that is needed is a glass tube, two corks and two pins. First obtain some phenolphtalien tablets at a drug store. Dissolve one tablet in as much water as your tube will hold. Next add as much salt to the solution as it will dissolve. Fill the tube with the solution and cork up the ends, leaving a small air bubble in the tube. Stick the pins through the corks. Now any current passing through the tube will turn the solution near one electrode red. This is the negative pole. If the tube is tilted so that the air bubble can come in contact with the red part of the solution, the red will disappear and the tube is ready for another test.

Any reader of *Modern Electrics*



who is interested in chemistry can understand the action from the following formulae: The salt in the water is acted upon by the current in this way:

$$2\ Na\ Cl = 2\ Na + 2\ Cl$$

This liberates chlorine and sodium. The chlorine goes into solution; the sodium ions are attracted to the negative pole. There they are freed of their positive charge and are free to act upon the water, in accordance with the formula:

$$2\ Na + 2\ H_2O = 2\ NaOH + H_2$$

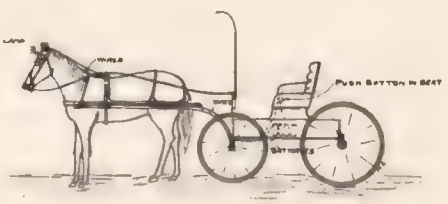
This action liberates hydrogen and sodium hydroxide. The latter, being a base, acts upon the phenolphtalien and turns it red.

Contributed by

EBERHARDT RECHTIN.

A "HORSE-LIGHT."

The following is a description of a "flashlight for the horse." A small four candle globe is used. The socket is riveted to the bridle, and the wires are connected, and run down the check rein, then down the side of the belly-band and onto the shaft. The wires should be placed on the underside of the shaft with staples, and run off at the axle tree and also fastened with staples. Then bring the wires under the buggy at the fifth-wheel and run



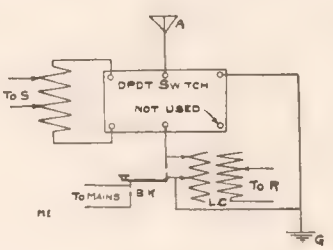
under the buggy and bring them in through a hole which should be bored in the bottom of the buggy. Connect to three dry batteries and also to a push-button which should be placed near the seat. When the button is pressed the light will light up. This is very interesting to see in the dark. One precaution is necessary, that is, to see that the light is not too close to the horse's eyes, as he would surely become frightened; the best place is a little below the ears.

Contributed by

ARTHUR L. LEGGETT.

WIRELESS SWITCH.

The illustration is a diagram for an aerial switch to be used in connection with a break-in key. This switch, if left open, enables the operator to test his coil without sending energy through his aerial and thus interfering with other stations. If thrown to the



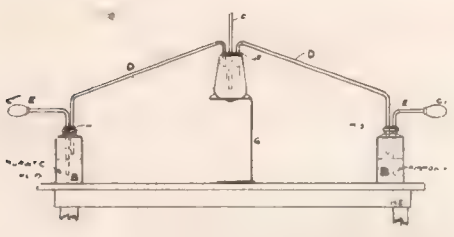
left it grounds the aerial, and so protects the wireless instruments from injury by lightning, while if it is thrown to the right, it is in a position for sending and receiving.

Contributed by

HAROLD KERR.

TO MAKE ONE'S OWN SAL-AMMONIAC.

This is a simple experiment, and the sal-ammoniac is suitable for all kinds of batteries. Secure an old incandescent lamp bulb and remove the base; this can be done by using a three-cornered file and cutting a line around the top of the lamp, give the base a slight tap and it will break off evenly all around. In the illustration A is the lamp bulb. B and B_1 are two glass bottles. C. and C_1 are plumbers' furnace bulbs. D. and D_1 are two bent glass tubes, bent as shown in the figure. EE_1 are also glass tubes



bent as shown. F is a straight glass tube. H, H_1 and H_2 are rubber corks. G is the holder for the lamp bulb, it is made from a piece of heavy wire, bent in the form of a circle, the remaining part being bent in the form of a right angle, and fastened to a wooden base. The bottle B is filled with ammonia and B_1 with muriatic acid. The tubes E, E_1 should reach almost to the bottom of the bottle, but the tubes D and D_1 should not. The tube F should extend three-quarters into the lamp bulb. The rubber corks must fit in the bottles and lamp bulb tightly. Where the tubes pass through the rubber corks a little shellac may be placed around the inside of the hole. Now by pressing both bulbs at once and with the same pressure, sal-ammoniac will form in the lamp bulb A. When the vessel A is full scrape out and begin anew. Be sure that the tubes extend into the bottles and bulb the same as shown in the figure.

Contributed by
EXPERIMENTER.

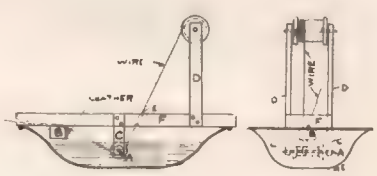
TO PARAFFINE WIRE.

Recently, on having a large quantity of wire to paraffine, I hit upon the following device and found that it did the work extremely well.

I first procured a 1 quart tin pan. Across this I laid a piece of wood about 4 inches wide and let it extend about 1 inch over the rim. The 2 standards D, for the spool of wire, were 1x½x4 inches. They were nailed to the sides of the base at about 1½ inches from one end. Between them the axle for the spool of wire was placed.

At the middle of the base 2 pieces of wood 1x½x2½ inches were nailed, the axle A was placed between them and it contained an ordinary sewing-cotton spool.

B is a 1 inch block of wood and on the side which is placed next to the base F, is a notch through which the wire passes. On the side of B nearest the standards C, is glued a square piece of leather. This leather contains a pin-hole which is placed directly in front of the notch in B. Then drill the hole E in the base F between the standards C and D. Between the block B and the paraffine tie a piece of



string on the wire and knot it so that it will not pass through the hole in the leather. By tightening and loosening this knot the thickness of the paraffine may be varied accordingly. Several nails are driven through the base near the rim of the pan to prevent it from slipping. After paraffine has been placed in the pan, the device is placed over a flame and a brick is placed upon it to prevent it from moving.

Contributed by
ALBERT G. FIEDLER.

A CORRECTION.

I noticed an article in the May issue in which Mr. I. G. Wichman claims to have used his body as a detector.

He placed his finger on the silicon so it is plain that the crystal formed the detector. By placing my detector switch handle on a dead point and holding one of my 'phone tips in my fingers, I have received messages from

World Radio History

a nearby station. The contact between the brass tip and my finger acted as a detector.

Contributed by

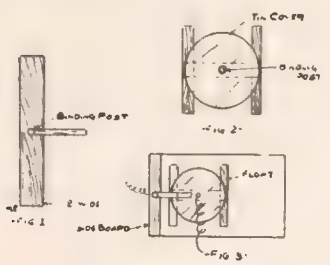
FRANK J. COREY.

A DRIP PAN ALARM.

This alarm is for the purpose of giving warning when the drip pan under the ice-box is full.

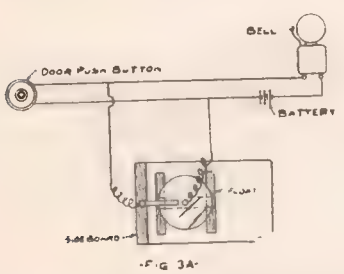
To make it, procure a piece of board long enough to bridge the pan at one end and three inches wide. Nail on this a piece of tin, projecting out from the side of the board as shown in the diagram. (Fig. 1).

Now make a float from three pieces



of wood (Fig. 2). Nail on this a tin cover taken off a coffee can and insert a binding post there, as well as on the side board.

Place the float in the bottom of the pan and clamp the side board across one end. Connect one wire to the tin



on the float and the other to the tin on the side board (Fig. 3).

Pour some water into the pan and the float will rise with the water, touch the contact and ring the bell. If it works perfectly put it under the ice-box and you may expect it to ring when the pan is full. Watch it a little the first day so as to get it perfectly adjusted.

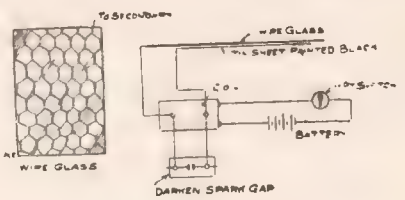
This alarm may be used in connection with the regular door bell. Figure 3a shows the proper wiring. A switch should be included in the circuit to shut off the bell.

Contributed by

DONALD PALMETER.

A NOVEL EXPERIMENT.

What might be termed as "A Novel Geissler Tube" can be constructed by procuring a piece of glass with chicken wire made in it, commonly used in elevator doors and skylights and shellacking to one side of it a heavy piece of tinfoil painted black, with the black side next to the glass leaving a margin of two inches all around. Break off all the wires around the edge of the glass except one as this is used for a connection as shown. Now, by connecting a one inch coil as shown to the glass and making a darkened spark gap in a paper or wooden box and taking the whole in a dark room, a most wonderful phenomena will be noticed. When the current is turned on the glass will all light up in a violet hue in the form of the wire and the little bubbles in the glass will become



fluorescent, each in a different color, probably due to gas formed when the wire was plunged into the molten glass. One of these contrivances in operation is very beautiful and I venture to say that all who make one will fully agree with me.

Contributed by

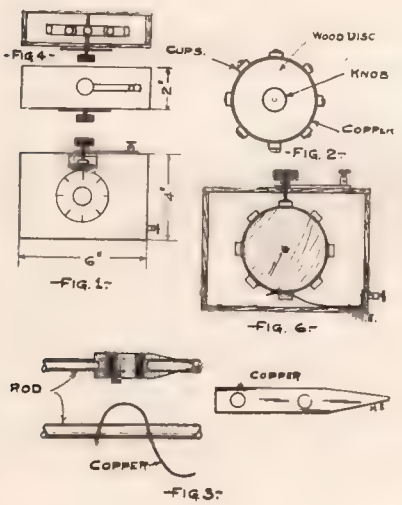
EDWARD W. HUTCHINSON.

ROTARY DETECTOR.

The case is made of 5/8-inch oak. It is 2 inches deep, 6 inches wide and 4 inches high. A small window is cut in the front at the top to inspect the contact. On top a large thumbscrew turns in a brass plate, to make contact. On the front there is a knob and pointer which will indicate what mineral is being used.

The wheel which the minerals are placed on is made of a strip of cop-

per (Fig. 2). Small brass cups which hold the mineral are soldered to this strip. This is then tacked around a wooden disc, 3 inches in diameter. Through this disc the shaft is placed which turns in the front and back of case for bearings. A copper strip is tacked to the bottom of the case, inside, which makes contact with the

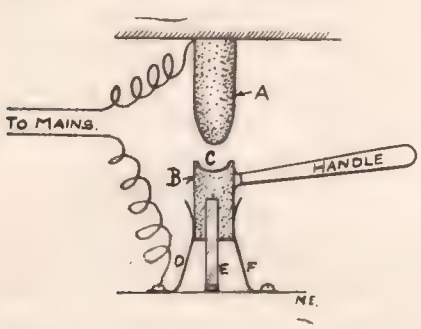


strip on the wheel. Connections are made from this strip and from the brass plate on top. The drawing will make the description more clear.

Contributed by
RAYMOND RUTHERFORD.

A QUICK MELTER.

The diagram is self-explanatory. A and B are battery carbons. C is a cavity drilled in the top of B. D, E



and F are strips of spring metal to hold B so that it can be quickly removed. G is an insulated handle.

To operate: Place metal to be melted in C and start the arc light. As soon as the metal melts, cut off current and quickly pour metal where wanted, using the handle.

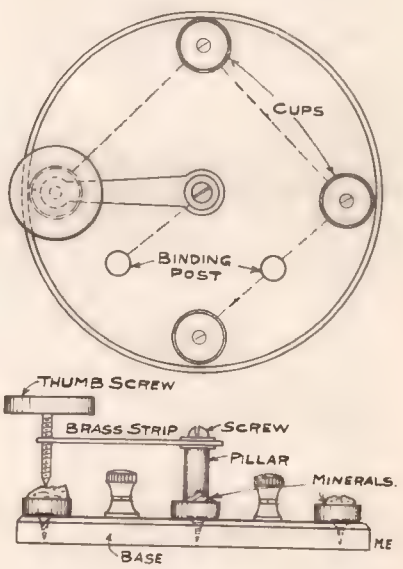
It is best to use colored or smoked glasses while the arc is on, as they protect the eyes.

Contributed by
J. DALLAS WISE, Jr.

A ROTARY DETECTOR.

The drawings of this rotary detector are, for the most part, self-explanatory.

The circular base may be taken from the bottom of a fig or cherry box. Brass or copper countersinks may be used for the mineral cups, and spring brass should be used for the swivel arm. For the thumbscrew, file or grind a point on a brass battery screw, and mould it into sealing wax—red or black. If the spring brass is thick enough, thread it to take the thumbscrew, and if not, solder a nut over a hole in the end of it. Adjust the cen-



ter screw, so that the arm does not swing too freely. Any number of cups may be used, and the dimensions may be set by the experimenter.

The advantages of this detector over the single detector or the slider detector are: that it acts (automatically) as a switch, it saves reaching around for different instruments, and it only requires, at the most, a swing of 180 degrees to reach the most distant mineral.

Contributed by
E. JAY QUIMBY.

VARIABLE CONDENSER.

The first thing to do is to obtain four pairs of handles from a medical coil. These may be obtained from almost any electrical house or from your friends who are equipped with medical batteries.

A piece of hard wood or fibre seven inches by six, and about half an inch thick will do for the base. Another piece of wood seven inches by two inches and half an inch thick will do for the upright shown in Fig. 1.

Now bore four holes in the upright, 1½ inches from the bottom and 1 3-16, 2 13-16, 4 5-16 and 5 15-16 inches from the end. These holes should take an 8-32 machine screw.

Screw the upright to the base and

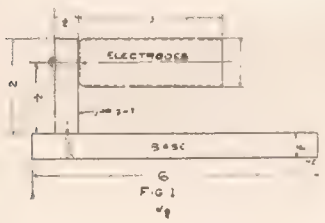


FIG 1

we are ready to use the electrodes. Remove the screws from each end and insert 8-32 battery screws through the holes left.

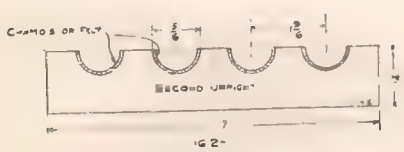


FIG 2

The four larger electrodes may now be clamped to the upright and the latter fastened to the base as in sketch. The four nuts may be connected by a piece of sheet brass or thin wire.

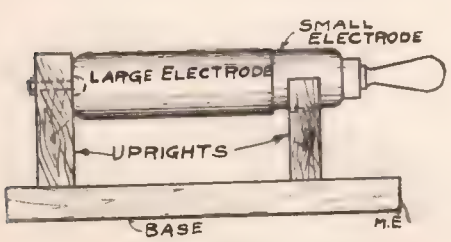
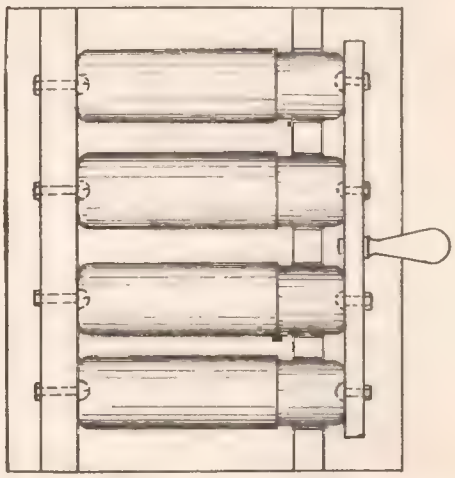


FIG. 3

Dip the four smaller handles in thick shellac and let stand till dried. A brass bar six inches long three-quarter inches wide and one-quarter inch thick is now clamped to the four smaller electrodes

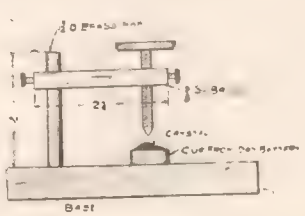


in the same manner as before. A handle may be fastened to the bar to facilitate its use. An upright is made of wood as in Fig. 2 and fastened to the base. Two binding posts complete the instrument. The movable electrodes should be connected to the binding posts and instrument should look like Fig. 3. A high polish on all wood and brass parts gives it a very handsome appearance and any amateur may well be proud of it on his instrument table.

Contributed by
STANLEY F. PATTEN.

A SIMPLE ADJUSTABLE DETECTOR.

Any boy with a set of stocks and dies or a machine shop where he can use them can make this detector. It

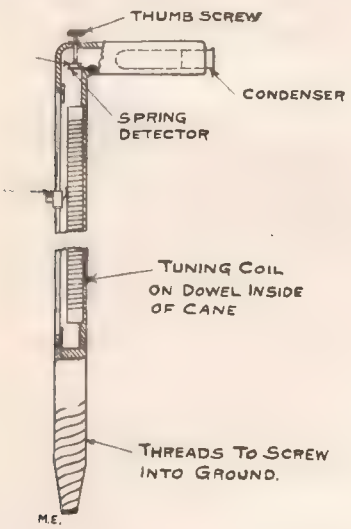


needs no explanation as by referring to the illustration the parts can be easily constructed.

Contributed by
THORNTON KEARFOTT.

PORTABLE CANE WIRELESS.

I think my cane wireless set will stand nearer the mast (wireless, of course), than L. O. Mumford's from which my idea came. The new one does away with the extra box which "the ultimate" uses, as there is a variable in the handle and a detector at the elbow as in drawing. There is a slot in the cane to allow a slider to move up and down the coil which is inside wound on a dowel as in "the ultimate's" drawing; the slider is mounted on a rod as is usual.

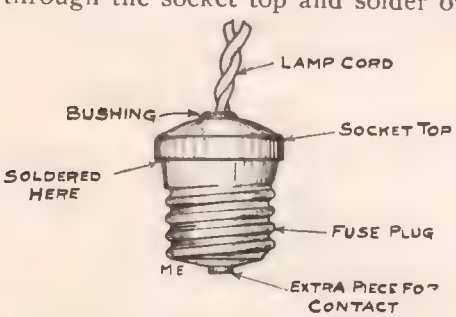


Contributed by

B. MORAN.

SIMPLE PLUG.

A very good attachment plug can be made from an old fuse plug and an old socket top. Pass the lamp cord through the socket top and solder one wire to contact in bottom of old fuse plug. This can be done easily by holding soldering iron on bottom of fuse plug. Solder the other wire to the brass screw part which screws into the socket. Now pull cord back so that the brass rim around the fuse plug comes into the socket top. Now solder the socket top to brass rim on fuse plug. If the plug doesn't make contact up in the socket solder a brass nut off of a battery on end of plug. I have used this plug and think it a very good one.



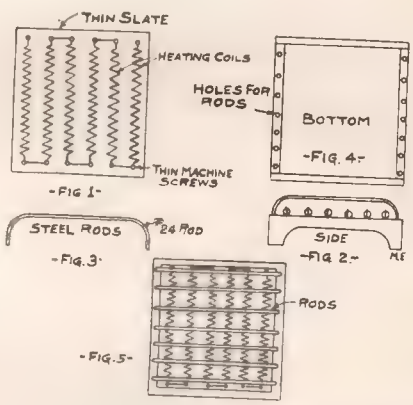
Contributed by

GERALD F. SYNACKLIN.

A GOOD TOASTER.

In the January, 1911, issue of Modern Electrics, on page 583, is the description of an "Electric Toaster." I think the following improvements would make it better:

In place of asbestos, which gives off very obnoxious fumes, when heated, I used a thin piece of slate to cover the bottom of the toaster, and thin machine screws instead of tacks. Along two edges of the sides I fitted steel rods, as shown in diagram, which I think will make all clear.



I have had very good success with this toaster.

Contributed by

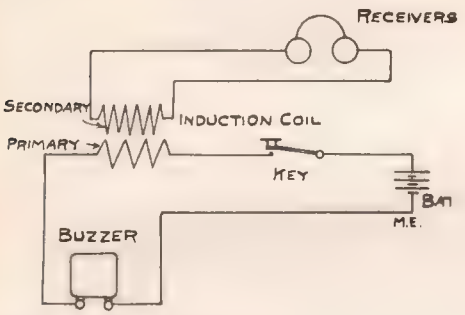
FRANK X. KEILING, Jr.

LEARNER'S OUTFIT.

I noticed in two or three of your recent issues a sketch for a "Learner's Outfit" which has several disadvantages which will be easily seen on looking at them closely.

The induction coil is one that is used in telephones and can be mounted on top or under the operating table. The buzzer should be mounted in the cellar or in some out-of-the-way

place so as to prevent drowning out of sound in receivers, which would occur were the buzzer in the same room with the operator. One cell of a good dry



battery will operate this outfit easily. I have worked three sets of phones on one cell, by hooking phones in multiple on secondary side.

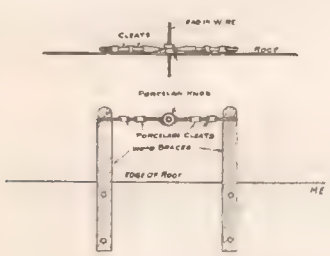
Contributed by

"C. P. M."

A LEAD-IN.

Many wireless experimenters are careless in the way they insulate the aerial lead-in from the house, consequently losing much valuable energy. I find the one shown in the enclosed diagram to be very efficient, even for large stations.

Two wood pieces are fastened to the



edge of the roof as shown, placed about two feet apart. Between the ends of these is fastened a sort of chain of insulating cleats, with a porcelain knob in the middle. The lead-in wire is brought down through the hole in the knob.

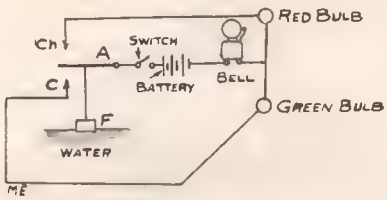
Contributed by

PERCY D. LOWELL.

WATER LEVEL SIGNAL.

This simple water level is very easily made and installed. It is used to show when the water level is too high or low.

I will not give any dimensions as all tanks vary in size and capacity. The illustration is partly self-explanatory.



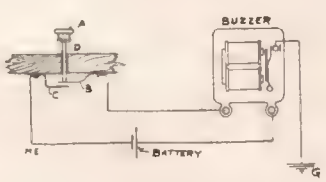
F is a float made of wood or an air-tight can, which moves A up or down and thus closing an electrical contact at C and Ch. A bell is connected in the circuit. At high water the bell rings and a small red light is illuminated, at low water a green light is lit and the bell rings.

Contributed by

B. F. DASHIELL.

PUSH FOR TABLE.

A short time ago I decided to put a buzzer test for my detector on my outfit. As I did not have a small push-button, I devised the following one: A small hole is bored through the table through which a rod D with a hard rubber knob A on it is passed



and is free to move with ease. This rod, as may be seen by referring to diagram, pushes on a spring B which makes contact with a lower spring C. The buzzer is just connected in series with the battery and the springs on the push.

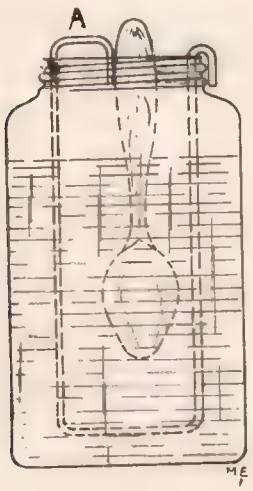
Contributed by

ALEX POLSON.

CLEANING TARNISHED SILVERWARE.

Following is an excellent way to clean tarnished silverware. Fill a one quart fruit jar three-quarters full of water and add about one ounce of salt and the same quantity of baking soda. A is a strip of zinc, bent as shown; the dimensions are ⅛x15x1

inches. The spoon is lowered into the solution and touched to the zinc ABOVE THE LIQUID for the space

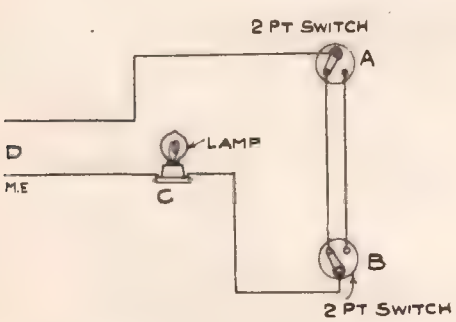


of 5 seconds when the upper half is plunged into the solution and treated the same way. The zinc should be removed each time when cleaning is completed.

Contributed by
EDWARD HUTCHINSON.

ELECTRIC LIGHT CONNECTIONS.

The following is an easy way to connect an electric light so that it may be turned on upstairs and off down-



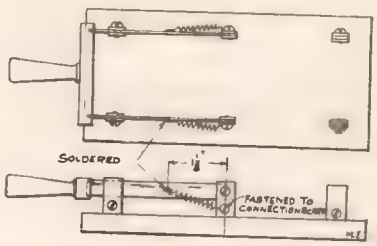
stairs or vice versa. The light is placed in a dark stairway or hall, etc.

In the diagram A and B are two double point switches, C is the light and D is the current supply.

Contributed by
B. F. DASHIELL.

QUICK ACTION SWITCH.

In order to obtain a quicker action in a double throw switch, I used two expansion springs in the manner shown



in the drawing. With this arrangement, the switch may be thrown over with less energy and in one-half the time, as the springs take the action as soon as the blades reach center. As an aerial switch it has no equal.

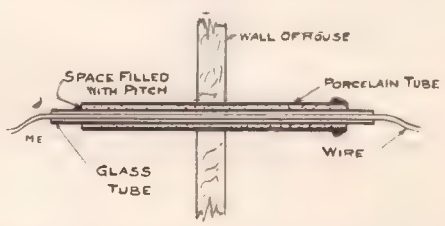
Contributed by
GEORGE UZMANN.

AERIAL LEAD-IN.

A very efficient aerial lead-in can be easily made as follows:

Procure a good-sized porcelain tube, a piece of glass tubing, large enough to slip the lead-in wire through some pitch.

Slip glass tube through the porcelain one, and fill the space in between with the melted pitch. The glass tube

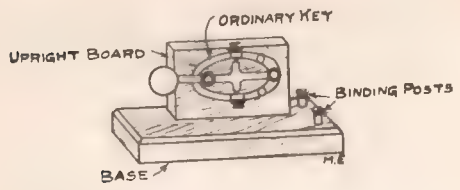


should be long enough to extend about three inches beyond each end of the porcelain one. Then slip the lead-in wire through the glass tube, and close up the ends of the glass tube around the wire with pitch to prevent moisture from getting into the tube.

TELEGRAPH KEY.

The accompanying sketch is my idea of an easily operated key. An ordinary key is mounted on an upright

board and operated by holding between

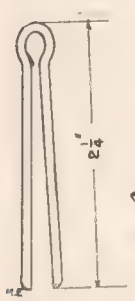


the thumb and forefinger.

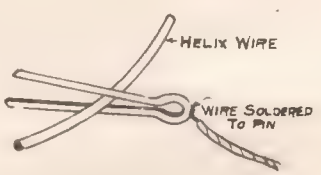
Contributed by
HEAGLE J. KIRK.

ANOTHER HELIX CLIP.

Enclosed find drawings of a helix clip of my own make. Procure a small link pin about 2¼ inches long. This when slipped over the helix wire secures itself tightly and the rounded



-FIG 1-



-FIG. 2-

shape of the top forms forms a place of connection for the wire from the clip.

Contributed by
SAMUEL T. CRITCHLOW.

SACRAMENTO WIRELESS ASSOCIATION.

The Sacramento Wireless Signal Club held its semi-annual election on June 6, 1911, with results as follows:

F. Strader, president; L. C. Huber, vice-president; E. Rackliffe, secretary; G. Ban Vard, treasurer; E. Miller, chief operator; F. P. Bruner, assistant operator; D. Sullivan, sentinel.

We have added an experimental department which is more than a success. We would be glad to communicate with other wireless clubs. Address all correspondence to Sacramento Wireless Signal Club.

Contributed by
L. C. HUBER, Secretary.
E. RACKLIFFE, President.
2119 H St., Sacramento, Cal.

POST THIS IN YOUR STATION.

NO, this is not a wireless station, it is a Ladies' Hairdressing Establishment.

Upon entering the room, do not fail to exclaim, "Gee, this is a dandy station," the operator never heard this sentence before.

Throw your old cigar and cigarette butts on the floor, spit on the floor, don't use the cuspidor, it was put here for an ornament.

Ask about forty-eight million questions and when you are through ask some more; the operator loves to answer them, especially those of the fool variety.

No, that core, wound with the heavy wire, which you see suspended from the ceiling is not a helix; it is a mouse trap which the owner uses to catch elephants with.

That odor of ozone which you smell does not come from the spark gap, it originates from a piece of cheese which the operator's mother keeps under her pillow so that she may sleep soundly.

After you are in the room, jump and stamp around; by no means stand still for an instant, for the detectors, which are very sensitive, are easily put out of adjustment and quite difficult to get back in again but, what's the difference, the operator enjoys sweating his head off, trying to adjust them again.

Yes, those are a very fine variety of plate glass in the condenser which the operator is saving for his old man who is building a chicken coop in which to breed hippopotomi and other rare fish.

That coil with the slide and contact points is a tuning coil, so named because it is used in tuning pianos.

The operator possesses a very keen sense of hearing. If he wants to, he can detect a message without the use of the head-phones, only he doesn't want to. Certainly, he likes to wear them because they make him look pretty. No, they are not heavy, in fact they are so light that they could be kept on the head for forty-eight hours without the wearer knowing they were there.

By all means, don't fail to grab hold of uninsulated wires in the secondary sending circuit. It is only high frequency voltage which plays along these

wires and would only burn your hands off, besides, people do say that rubber gloves make one's hands perspire something dreadful.

No, the aerial is not on the roof, it is kept in Lizzie's room.

WM. D. FINKELSTEIN.

Book Review.

WIRELESS "HOOK-UPS."

Selected and arranged by G. E. Rudolph.

Wireless "Hook-Ups," with a Chapter by H. Gernsback. Published by Modern Electrics Publication. 96 pages, 157 illustrations and diagrams. Price $0.25.

This book fills a long-felt want among the amateurs and experimenters. They have now the advantage of securing a complete set of diagrams, from the simplest circuit to the most complicated commercial circuit, within the covers of a popular priced book. This book contains diagrams for both sending and receiving apparatus under different classifications, namely, tuned and untuned circuits. A word of explanation accompanies each diagram, and so gradual is the step between each diagram, that the reader is sure to find some hook-up applying exactly to the particular instruments he has. A good part of the book is devoted to complicated circuits, as for instance the Duplex aerial sets, the Directional aerial sets, and others.

It is a book which should be found in the library of every amateur and experimenter in wireless telegraphy, so that he may get the maximum efficiency from his instruments by using the best diagrams.

MATHEMATICS FOR THE PRACTICAL MAN.

By George Howe, M.E.

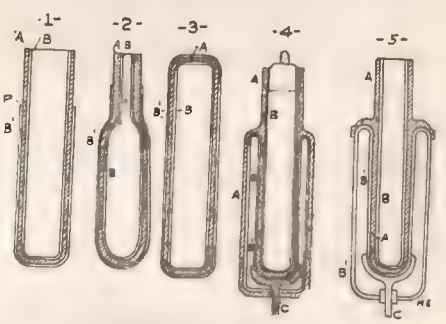
Mathematics for the Practical Man. By George Howe, M.E. Published by D. Van Nostrand Company, New York, N. Y. 143 pages, and 42 illustrations. Price $1.25.

The author has more than accomplished his design. He wrote the book with the intention of explaining in a simple manner, the solving of problems in Algebra, Geometry, Trigonometry, and the higher mathematics. He brings forward simple explanations which can be understood by the ordinary educated reader. It should be an invaluable book to students in practical engineering, who have not had the opportunity of a complete foundation in their knowledge of mathematics.

Besides many illustrations, demonstrating the solving of geometric problems, the book contains tables on logarithms, natural sines, natural cosines, natural tangents, and other valuable tables. To all persons who have experienced difficulty in mastering the details of mathematics, this book no doubt could be resorted to with excellent results.

IMPROVED CONDENSER.

When a condenser is made as shown in Fig. 1, with the glass at A and the coatings at B and B^1, it is well known that there is a tendency to break down the glass at the upper border, P, of the outer coating, owing to the greater effect of the electric charge at this point. To overcome this, the form (2) was invented and the glass is made much



thicker at this part. While this may give a strong condenser, such a glass vessel is hard to make in practice, seeing that the glass needs to be from 3 to 5 times as thick in the upper part. The following form of condenser is claimed to be an improvement, as it is much easier to make. Fig. 3 would be the ideal form, with a completely closed glass vessel and continuous inner and outer coatings, and there is now no border which causes the glass to break down. But as we cannot bring in the charge to the inner coating, this kind of condenser could not be used. However, we can make a form which answers the same purpose

(Continued on Page 265.)

Wireless Telegraph Contest

Our Wireless Station and our Laboratory Contest will be continued every month until further notice. The best photograph for each contest is awarded a monthly prize of Three (3) Dollars. If you have a good, clear photograph send it at once; you are doing yourself an injustice if you don't. If you have a wireless station or laboratory (no matter how small) have a photograph taken of it by all means. Photographs not used will be returned in 30 days.

PLEASE NOTE THAT THE DESCRIPTION OF THE STATION MUST NOT BE LONGER THAN 250 WORDS, AND THAT IT IS ESSENTIAL THAT ONLY ONE SIDE OF THE SHEET IS WRITTEN UPON. SHEET MUST BE TYPEWRITTEN OR WRITTEN BY PEN. DO NOT USE PENCIL. NO DESCRIPTION WILL BE ENTERED IN THE CONTEST UNLESS THESE RULES ARE CLOSELY ADHERED TO.

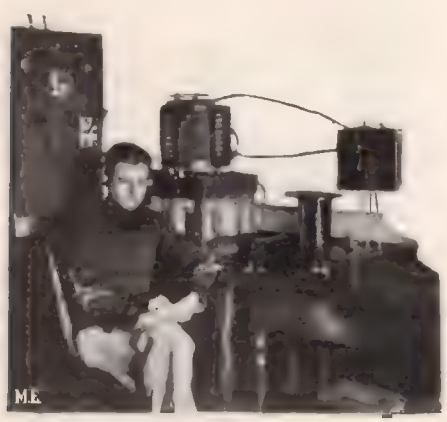
It is also advisable to send two prints of the photograph (one toned dark and one light) so we can have the choice of the one best suited for reproduction.

This competition is open freely to all who may desire to compete, without charge or consideration of any kind. Prospective contestants need not be subscribers for (the publication) in order to be entitled to compete for the prizes offered.

FIRST PRIZE THREE DOLLARS.

THIS station was constructed by myself for experimental purposes at school in Charleston, South Carolina.

The sending instruments are composed of six two-quart Leyden jars, three on each side of the spark gap. The helix is wound with eight turns of No. 8 brass wire, which is inserted



in holes one-half inch apart. The spark gap which is on top of the helix is mounted on a marble base 2½ inches wide and six inches long, with binding post to fit zinc rods. I use a two-inch spark coil which is run on the 110 A. C. This is done by using six 32 c. p. lights connected in multiple. By using this a good hot spark is obtained such as desired in wireless work. A Morse telegraph key is used in sending with extra heavy platinum points. The switch-board to the left controls the alternating current.

The receiving instruments are contained in and on an oak box which is my own design. Use two tuning coils wound with No. 31 B. & S. gauge wire. The large coil can be thrown in by a switch on the receiving box. On the box is a silicon detector. The receivers are E. I. Co., wound to 2,000 ohms. A triple pole, double-throw switch is used for aerial.

The aerial is of the looped form which is suspended from a cupola 85 feet from the ground, running from cupola to other end of the building which is 90 feet long. The spreaders are six feet long with four phosphor bronze wires.

With this set a distance of thirty miles can be reached by the sending instruments. On the receiving instruments I have heard most all the stations from Tampa, Florida, to Manhattan Beach. I also communicate often with the Clyde steamers.

Contributed by
CROMWELL GIBBONS, Jr.
Florida.

HONORABLE MENTION.

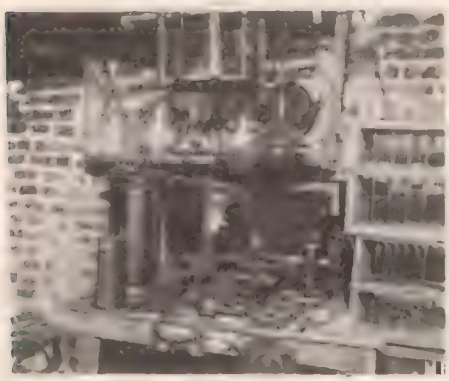
Enclosed please find flash photo of my station located in the attic of my home.

The sending set consists of a heavy

contact wireless key, one-fourth kw. transformer, one inch induction coil running on alternating current with two ten-inch gas lighting coils in series, forty plates of condenser, each plate twelve by fifteen inches and adjustable, rotary spark gap, anchor gap, helix, buzzers, sounders, etc., for testing.

The receiving apparatus includes Atlantic type head-phones of two thousand ohms resistance, five detectors, viz.: ferron, silicon, galena, perikon and electrolytic with potentiometer, loose coupler tuner, loading coils, condensers, fixed and rotary-variable.

The aerial, which is ninety feet above the ground, is of the five wire



compromise type, mounted on ten-foot spreaders. The wires are two feet apart and heavily insulated.

Last year I made numerous tests with the Radio and Collins Wireless Telephone companies and heard, with remarkable distinctness, band concerts, monologues, singing, etc., transmitted through the wireless telephone by means of a phonograph.

My record for overland receiving was made about six months ago when I picked up the Clark Wireless Station of Wisconsin.

Contributed by

WM. D. FINKELSTEIN,
Newark, N. J.

HONORABLE MENTION.

Enclosed please find photo of my wireless telegraph station. Receiving apparatus consists of Murdock loose coupler and slide plate condenser also Murdock detector, ferron detector, two loading coils, a large and a small one (large one not shown in picture), two fixed condensers and pair 3,200 ohm Navy type phones.

Transmitting set consists of three pole aerial switch, three-quarter inch spark coil, two one-pint Leyden jars, helix of about 45 feet No. 16 copper wire spaced one-half inch between turns, zinc gap and Morse key. For power I use a 6-volt 60-ampere storage battery.

Aerial consists of about 450 feet of No. 16 aluminum wire 50 feet at highest end and 25 feet at lowest end. I am a subscriber of *Modern Electrics* and think it the best magazine on wireless. My call is W. H. I.

Contributed by

C. L. EVANS,
East Orange, N. J.

HONORABLE MENTION.

Enclosed find photo of my wireless station. My receiving outfit consists of a one-thousand meter tuning coil

(single slide), silicon detector, fixed condenser, and seventy-five ohm receiver. The tuning coil and detector are home-made, as are all the instru-

ments, receiving and sending, except the sending key and the telephone receiver. The sending outfit consists of a key, a one-quarter kw. transformer-coil, helix, 250 watt, 110-120 volt step-down transformer to operate the sending coil, and condenser, (not shown in picture). My aerial is made of four copper wires ninety-five feet long. It is fifty feet high at one end and thirty-five feet at the other.

A few months ago I had no wireless station, and knew very little indeed of the science. A few words explains it all; I had not yet come across *Modern Electrics*.

Contributed by

FRED MAYER,
Vancouver, Washington.

HONORABLE MENTION.

Enclosed you will find photo of my wireless telegraph station:

For sending I use E. I. Co. one-inch coil, helix, adjustable condensers, "electro" zinc spark gap, and a Mecograph key. For receiving I use a 1,000 ohm receiver, "electro" tuner, Jr., fixed condenser, variable condenser, slide plate type (all E. I. Co.'s make), E. I. Co. peroxide of lead detector,

silicon, molybdenite detectors (home made), E. I. Co.'s rheostat, and potentiometer, one large D. P. D. T. switch. I also have an automatic telegraph transmitter and vibro-phone for learning codes, also telegraph sounder. I get excellent results from the little "electro" tuner, Jr. I have at times heard New Orleans, La., pretty well for such a small coil. I have also heard Waco, Tex., calling Ft. Worth, Tex. I hear the Ft. Worth station without any special adjustments. My aerial consists of 5 No. 14 aluminum wires 2 feet 6 inches apart, 45 feet high, 40 feet long of the L type. I am a reader of *Modern Electrics* and find many interesting articles on wireless. I am also a member of the Wireless Association of America.

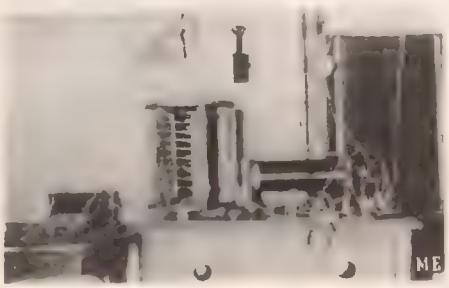
Contributed by

J. A. HYBARGER,
Texas.

HONORABLE MENTION.

Enclosed please find photos of my wireless station, it consists of:

E. I. Co.'s 1-inch spark coil; E. I.



Co.'s zinc spark gap; glass plate condenser; my own make helix; Morse key.

For receiving I have electro silicon and electrolytic detectors, fixed condenser, E. I. Co.'s phones, 2 slide tuning coil, electro rheostat, 2 two-point switches; my aerial consists of No. 14 aluminum wire, 5 strands 4 feet spread, 50 feet high, lighting arrester.

My call letter is A. A.

Contributed by

GEO. W. FIELD, Jr,
New York.

HONORABLE MENTION.

The inclosed is a picture of my little wireless station which consists of:

One-inch coil, adjustable jump spark balls, plate fixed condenser, Leyden jar, sending helix, telegraph key, switches for the transmitting.

For the receiving I have a three-slide tuning coil, variable and fixed condenser, potentiometer, electrolytic and silicon detectors, 75, 120 and 2,000 ohm receivers.

The aerial is composed of two aluminum wires 90 feet long and 16 inches apart at 100 feet from the ground.

With the exception of the spark coil and phones all the instruments are of my own construction. I am making

now a Marconi wireless telegraph that I expect to photograph soon.

Contributed by
ROCCO LEPORE,
New York.

HONORABLE MENTION.

I have the honor of sending you a photo of the wireless station. This is the first time and the only one sta-

tion in charge of a Chinese in this city.
Contributed by
New York. CHIN Y. CHONG,

HONORABLE MENTION.

The accompanying photograph is of my wireless station. Most of the equipment was made by me. I followed instructions given in "Modern Electrics," of which I have been a subscriber since its first issue.

In constructing the receiving set I made it as compact as possible without effecting the sensitiveness. It consists of an inductive tuner, mounted on an oak cabinet with two Ferron type detectors, which can be seen just in front of the coil. By means of a small two-point switch between the two detectors, I can change quickly from one to the other. All of the above was home-made, and in addition to this, I have an E. I. Co.'s variable and fixed condenser inside of the cabinet. The E. I. Co.'s 2,000 ohm phones and a slide plate variable at the left of the picture complete the receiving set. I am using silicon and galena, having had the best

success with them, hearing B. F. of Buffalo quite clearly.

For transmitting I have an E. I. Co.'s ½ kw. coil, and an eight-volt one hundred-ampere hour National storage battery. The glass plate condenser is in the box, under the zinc spark gap, both of which I made; the gap being mounted on a piece of white floor tile. The helix of eleven turns of No. 6 copper wire, is spaced one inch apart on a hard wood frame.

I have been interested in wireless for four or five years, having had a station a little over a year. Am also a member of the W. A. O. A. My call is M. D. and would be glad to hear from anyone interested in wireless.

MERRITT MOSHER,
Rochester, N. Y.

World Radio History

Flying Sparks

A LESSON IN NAVIGATION.

"If you are very good, I'll show you——

'——how to play steamboat."—Le Rire.

BY WIRELESS.

The true facts in the case of Jonah and the whale.—Puck.

THE NEWEST MENACE.

German scientist now says that the atmosphere is becoming dangerously charged with Escaped wireless.—N. Y. Press.

HOW IT IS DONE.

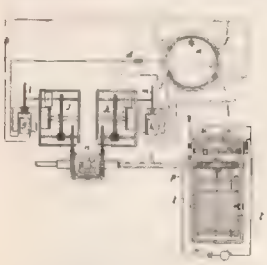
The clever Frenchman finds an easy method to drill a hole.—Pêle-Mêle.

IN DARKEST AFRICA.

How King Tru-la-la takes his bath without running the risk of drowning.—Pêle Mêle.

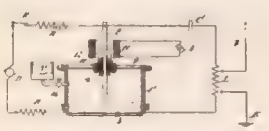
Electrical Patents for the Month

994,678 MEANS FOR RECORDING AND GAGING A SHIP'S DEVIATIONS FROM ITS COURSE. WILLIAM HENRY HEXMAN and ARTHUR KEMP, Waitangi Reserve, Wellington, New Zealand. Filed Aug. 7, 1909. Serial No. 511,807.



1. In means for recording and gaging a ship's deviations from its course a stylus mounted against a traveling record strip and adapted to mark thereon, mechanism for moving such stylus transversely in reverse directions, a pair of electromagnets controlling such mechanism, and means whereby such magnets may be proportionately varied in strength in direct ratio to the degree of deviation of the ship to either side of its course, substantially as specified.

995,330. SPARK TELEGRAPHY. LEE DE FOREST, New York, N. Y., assignor to De Forest Radio Telephone Co., a Corporation of New York. Filed June 20, 1907. Serial No. 379,922.



1. In a system for developing and radiating a practically continuous train of electromagnetic waves of substantially uniform amplitude, arc electrodes, a source of current connected in circuit with the electrodes, capacity and inductance shunting the electrodes, and means for automatically moving the electrodes relatively to each other.

995,213. ELECTRIC FOOT WARMER. SILAS BALLARD, Temple, Tex. Filed Mar. 28, 1910. Serial No. 552,108.

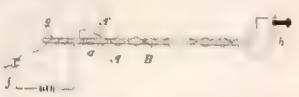
The herein described electric foot warmer comprising a hollow egg shaped body divided transversely adjacent its large end to form a body section and a cap section, both of said sections being composed of similarly shaped spaced walls of rigid material, an insulator filling between the spaced walls of the body section a cylindrical sleeve at the small end of the body section and forming an opening to receive a lamp socket, a rim uniting the spaced rigid walls of the body section at its large end and forming an exteriorly screw threaded flange, a rim uniting the spaced rigid walls of the cap section at its large end and forming an internally screw threaded flange to engage the first named flange whereby the cap section is detachably secured to

the body section, a lamp socket in the sleeve at the small end of the body section, and an electric lamp in said socket, the inner surface of the body section being polished to reflect the light from the lamp out of the large end of the body section when the cap section is removed.

996,080. WIRELESS TELEPHONE SYSTEM. MAURICE BERNAYS JOHNSON, San Antonio, Tex. Filed Oct. 6, 1910. Serial No. 585,544.

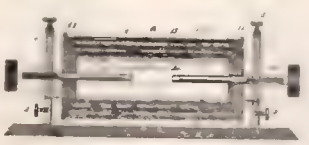
In a wireless telephone system a bell, a battery, two ground connections, a two-pole switch adapted to connect either said bell or said battery in circuit with said ground connections or to break both said circuits, a switch for controlling each last named circuit, and telephone instrument, the same being connected with said system but the circuit through which is normally broken.

995,588. ELECTRIC WAVE TRANSMISSION. JOHN STONE, Hoboken, N. J. Filed Mar. 11, 1907. Serial No. 362,513.



1. In a line for the transmission of varying electric currents, a paramagnetic core, and outgoing and returning continuous conductors disposed helically in opposite senses about said core, so as to counteract suitably the electrostatic capacity of the line.

996,091. SPARK GAP MUFFLER. MAURICE BERNAYS JOHNSON, San Antonio, Tex. Filed Oct. 6, 1910. Serial No. 585,546.

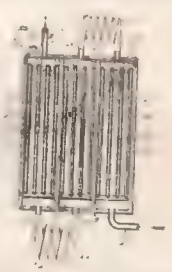


1. A spark gap muffler comprising a base, two stand arms supported by said base, two terminals arranged in line with one another and supported by said standards, said terminals being adjustable toward and from one another to thereby vary the distance between their inner ends, two plates supported one by each of said terminals, and having each a plurality of concentric seats, a plurality of concentric glass cylinders supported by said plates and the ends of which engage the seats aforesaid, and means engaging said plates for preventing movement of said plates and the cylinders supported by them.

996,011. SCREWLESS SPRING CONTACT. HENRY WILLIAM, New York, N. Y. Filed Feb. 18, 1909. Serial No. 478,017.

1. In a screwless contact device, the combination with a back of a contact member formed of a single strip having an integral part passing through the back and formed into a loop and also having an integral part passing through the back and having a bent portion lying against the back and cooperating with said loop for clamping the contact member to the back and a lead wire in position.

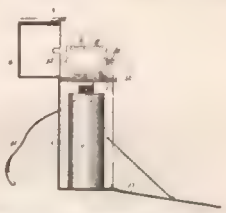
994,294. OZONE GENERATOR. FRANCIS P. WHITAKER, Los Angeles, Cal. Filed Oct. 17, 1910. Serial No. 587,178.



1. A terminal plate, comprising a metallic base, and a facing of porcelain substance deposited upon the base.

2. A terminal plate, comprising a base of an electrical conductor, and a facing of porcelain material for the base bonded thereto and completely covering the same.

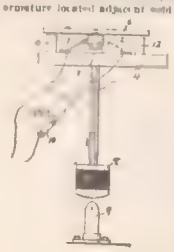
996,092. BOX FOR CARRYING WIRELESS SIGNALING APPARATUS. MAURICE BERNAYS JOHNSON, San Antonio, Tex. Filed Oct. 6, 1910. Serial No. 585,548.



1. A case for the transportation of [illegible] comprising a body portion adapted to contain a battery, a platform closing the upper end of said body portion, a broken top or cover hinged at the upper end of said body portion and having a seat at each end thereof, two rods secured one at each end of said platform and each of which rods carries an electrical conductor, a metallic peg secured to the end of each of said conductors, the location of the plate aforesaid being such that one of them is adjacent to each of said rods when the cover is closed, and means upon the ends of said rods adjacent said slots for supporting said metallic pegs, substantially as described.

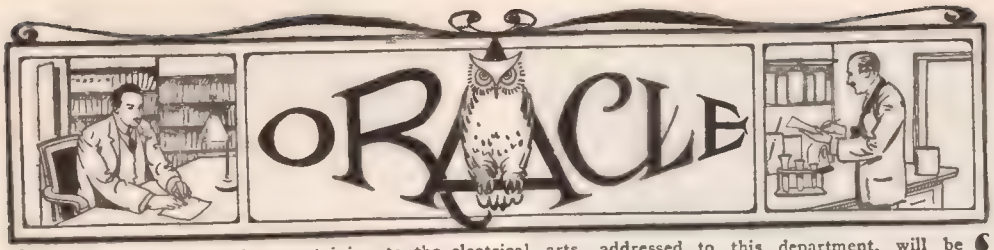
996,087. BALANCING MACHINE. JOHNSON PRODUCTS MFG. COMPANY, Milwaukee, Wis., a Corporation of New Jersey. Filed Mar. 27, 1907. Serial No. 364,324.

1. The combination with an oscillatable support, of a turntable carried thereby, a rod extended from said support, an electromagnet carried by said rod, and a stationary armature located adjacent said magnet.



Original Electrical Inventions for which Letters Patent Have Been Granted for Month Ending June 27, 1911

Copy of any of the above Patents will be mailed upon receipt of 10 cents.



Queries and questions pertaining to the electrical arts, addressed to this department, will be published free of charge. Only answers to inquiries of general interest will be published here for the benefit of all readers.

On account of the large amount of inquiries received, it may not be possible to print all the answers in any one issue, as each has to take its turn. Correspondents should bear this in mind when writing.

Common questions will be promptly answered by mail if 10 cents to cover expenses have been enclosed. We can no longer undertake to furnish information by mail free of charge as in the past. There are as many as 150 letters a day now and it would be ruinous for us to continue acting as a free correspondence school.

If a quick reply is wanted by mail, a charge of 15 cents is made for each question. Special information requiring a large amount of calculation and labor cannot be furnished without renumeration. THE ORACLE has no fixed rate for such work, but will inform the correspondent promptly as to the charges involved.

NAME AND ADDRESS MUST ALWAYS BE GIVEN IN ALL LETTERS. WHEN WRITING ONLY ONE SIDE OF QUESTION SHEET MUST BE USED; DIAGRAMS AND DRAWINGS MUST INVARIABLY BE ON A SEPARATE SHEET. NOT MORE THAN THREE QUESTIONS MUST BE ASKED, NOR SHALL THE ORACLE ANSWER MORE THAN THIS NUMBER. NO ATTENTION PAID TO LETTERS NOT OBSERVING ABOVE RULES.

If you want anything electrical and don't know where to get it, THE ORACLE will give you such information free.

A TALK WITH OUR FRIENDS.

We are daily receiving numerous requests from our many amateur friends, requesting us to inform them as to the radius which they should cover with their outfits.

We believe that it is a timely moment to have a few words said, regarding this matter.

Probably few experimenters realize what a vague estimate may be made concerning the radius of any station from mere description. We have always made conservative estimates of ranges from the data which was supplied to us, yet fully realized that it was only a guess at the most. There are so many factors which enter into the effective range of a station, that our statement has reasonable grounds. For instance, mentioning a few, we will first consider the location. On the Atlantic Coast, conditions for Wireless Telegraphy are fairly good. On the other hand, in the Pacific Coast states, the conditions are excellent, probably due to the ideal weather. The other extreme is in the tropics, where a reasonable range can only be obtained with a tremendous expenditure of power. We have heard of cases where it was impossible to cover 100 miles using 8 k.w. in the middle of the day. Taken for granted that the hook-up is correct and the apparatus is being used properly, we have again to figure on the aerial. Some aerials are figured from the ground of the building when the height should be figured from the tin roof of the building. This is very important, inasmuch that tin roofs are nearly always grounded and therefore the effect gained in the height of the building on which the aerial is located, is almost negligible. Aerials should always be soldered at the connections wherever possible, and the joints taped if aluminum wire is used and not soldered.

Surroundings have a great deal to do with the transmitting radius. A large steel structure near by may reduce the transmitting range to a marked extent, while not having such a marked effect on the receiving radius. The operator's hearing power should also be considered. Some operators can hear signals where others will only detect indistinct rumbles, or nothing at all. Doesn't this make an important factor in the receiving efficiency? The crystals used in detectors all vary to a marked extent. With some, a distance of 100 miles is the maximum, while with others this distance is mere play. There are probably 10 other factors equally as important which enter into the effective range of a station, so the reader can readily appreciate the ***uselessness of asking such questions regarding ranges.*** *We have always based our statements on the conservative averages obtained by other stations using similar apparatus.*

To sum up this matter, we would ask that questions relating to ranges or wave-lengths of outfits be avoided in the future. We can only give estimates on standard apparatus with standard aerials and conditions, and not individual inquiries.

MODERN ELECTRICS PUBLICATION.

WIRELESS DIRECTED TORPEDOES.

(990.) G. P. Mobley, Tex., asks:

Q. 1.—Please explain the principle by which a torpedo is directed from a ship or shore station by wireless.

A. 1.—Most of the torpedoes employing the wireless control, use the coherer and the other well known accessories for receiving the impulses. In connection with these, a special control relay governing the various circuits is employed. This relay closes a definite cir-

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The **Help Wanted** columns of trade papers teem with appeals for trained men. Draftsmen are wanted; foremen are wanted; superintendents are wanted; machine designers are wanted; chemists are wanted; advertising men are wanted; electrical, civil, mechanical, and mining engineers are wanted; architects are wanted. Your salary will always be governed by the kind of work you are prepared to do. How much salary are you worth?

It will cost you nothing but postage to find out all about the I. C. S. plan for making you worth more salary. Mark and mail the coupon. Doing it will place you under no obligation. Don't wait till tomorrow.

Mark and Mail the Coupon NOW.

International Correspondence Schools
Box 992, Scranton, Pa.

Please explain, without further obligation on my part, how I can qualify for a larger salary and advancement to the position, trade, or profession before which I have marked **X**.

Electrical Engineering	Mechanical Engineer
Electric Lighting	Mechanical Draftsman
Electric Railways	R. R. Constructing
Electrician	Concrete Construction
Electric Car Running	Architect
Dynamo Foreman	Contracting and Build'g
Dynamo Tender	Architectural Draftsman
Wireman	Plumbing & Heating
Mining Engineer	Chemist
Telephone Expert	Bookkeeper
Civil Engineer	Advertising Man
Automobile Running	Civil Service Exams.

*Name*_____

St. & No.

*City*_____ *State*_____

When writing, please mention "Modern Electrics."

cuit on receiving a certain number of impulses from the transmitter. Owing to political reasons, little information can be obtained of the successful types which have been developed in the last few years.

Q. 2.—Besides the coherer, are there any contrivances used by wireless stations, whereby a call can be registered by bell or otherwise?

A. 2.—There are several other detectors which may be used instead of the coherer for working a relay, which in turn controls the recorder. Among the early apparatus we find the Lodge-Muirhead system using a small steel wheel immersed in mercury, and the Branley-Popoff system using the small disk with three steel pointed legs resting lightly on a sheet of steel. These can be used to work a relay. In latter years we find a much better system used, namely, the "resonance relay" which works in connection with any of the standard detectors as galena, silicon, perikon, etc.

RECEIVING AND SENDING RANGES.

(991.) Harold Arntzen, Col., asks:

Q. 1.—With the following instruments could I receive 1,000 miles under favorable conditions? Instruments are—electrolytic, ferron, silicon, carborundum, and peroxide of lead detectors, loose-coupler coil, with two slides on primary, and a variation switch on the secondary, double slide tuning coil, Electro Importing Co., large, make. Fixed condenser and three variable condensers, one rotary and two tubular, 2,000 ohm phones on head-band, potentiometer of 500 ohms, non-inductive. Four dry cells for receiving, all necessary switches, etc. The aerial is 74 feet high at one end, 33 feet at the other, 98 feet long, made up of four wires 1 foot apart, No 12 copper.

A. 1.—Under favorable conditions we believe that the above outfit should be able to receive 600 to 800 miles. The aerial is probably too small to allow the 1,000 mile range With an aerial 200 feet long, composed of four wires spaced 3 feet apart, the 1,000 miles could easily be obtained.

Q. 2.—What comprises the best 15 mile outfit for transmitting?

A. 2.—To transmit a range of 15 miles under all conditions, a 3 inch coil should be used in connection with the correct helix, condenser, spark-gap, and the aerial above mentioned.

Q. 3.—Please tell me if it is possible to make one Type S dynamo run another Type S dynamo by belting it direct to the other one? What is the output of Type S dynamo? Will one of them charge a 6-volt 60 ampere storage battery?

A. 3.—A Type S dynamo may be used as a motor to drive another similar machine, but the one acting as a dynamo will not produce the full output. The output of this dynamo under full load is 6 volts and 4 amperes, making a total delivery of 24 watts. As storage cells use a trifle higher voltage to charge them, then what they give out, a Type S dynamo could be used if driven at

a higher speed than the normal, or about 3,500 revolutions per minute, to charge the above mentioned accumulator.

ABOUT A ¼ K.W. TRANSFORMER.

(992.) H. F. Cook, Ohio, asks:

Q. 1.—Kindly advise me through your magazine if a ¼ kw. closed core transformer, will do for a high-frequency electric machine for therapeutic purposes. I have one of the ordinary kind that gives a long slender spark, which has an interrupter and makes considerable noise. I know of one that has no interrupter and gives a ¾-inch fat spark, which has considerable more volume to it than mine.

A. 1.—A ¼-kw. closed core transformer would be very suitable for therapeutic when used in connection with the Oudin Resonator and other necessary accessories. We can highly recommend this apparatus over that of an ordinary spark coil, or static machine.

Q. 2.—Kindly advise me how the closed core transformer would work and if a ¼-kw. would be large enough.

A. 2.—The ¼-kw. transformer could be used in connection with the apparatus, as it is sufficiently powerful. The current used on this coil should be 110 volts, alternating current.

STORAGE BATTERY.

(993.) Earl Deardorff, Ore., enquires:

Q. 1.—How to make a good storage battery capable of running a 3-inch spark coil to fullest capacity?

A. 1.—We know of no better and economical way than to procure battery plates from some supply house. These may be obtained at low cost. To run the 3-inch coil we would suggest 5 cells, each having a capacity of 60 ampere hours.

Q. 2.—Is a 25 volt 300 ampere hour battery a good size in connection with a 3-inch coil?

A. 2.—The battery you enquire about, is far too large for a 3-inch coil. Such a coil should not be used on more than 15 volts at the utmost. However, by connecting the cells in series-parallel, the voltage would be correct, as well as giving the advantage of greater ampere hour capacity.

Q. 3.—What is the trouble when one wireless receiver works part of the time and the other part of the time? What is the remedy?

A. 3.—The trouble is very likely due to a loose connection in the cord. As these cords are made of fine tinsel for conducting the current, a sudden strain may destroy the connections within the cord. We would suggest that you try another receiver cord. Perhaps, also, there may be a loose connection inside of your receiver.

AERIAL CONNECTIONS.

(994.) Otto Galla, Ill., asks:

Q. 1.—Which of the following ways (as shown in diagram) is best for connecting an aerial 30 feet high at one end and 44 at the other, using 8 wires 50 feet long on 12 foot spreaders; lead taken off the highest end?

A. 1.—For both receiving and sending, we would suggest connecting the aerial as shown in diagram "c." However, instead of taking only two leads into the station, we would

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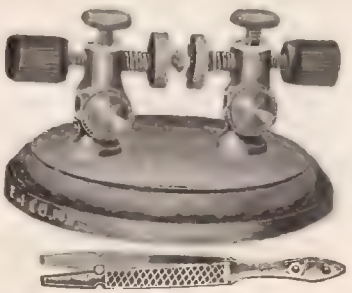

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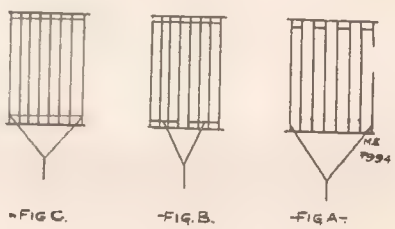
recommend a lead taken in from each wire, and the whole bunched together before entering the station through the leading-in insulator. This greatly increases the efficiency of the transmitting range. The leading-in wires should be taken off from the lower end of the aerial if possible.

Q. 2.—Which gives the longest wave-length?

A. 2.—In all probabilities, the aerial connected as per figure "a" would have the longest wave-length. This practice of having the wires on an aerial all in series should be



avoided, for it greatly reduces the transmitting range as well as the receiving radius.

Q. 3.—How can I determine the negative terminal of the secondary of a spark coil with a Geissler tube?

A. 3.—In all forms of Geissler tubes, the polarity of the electrodes may be determined readily. The terminal which is surrounded with a blue haze is the negative. The other is surrounded with a rose colored light; varying in shade; in different tubes.

RECEIVING RADIUS AT NIGHT.

(995.) Robt. F. Adams, Texas, states:

Q. 1.—Some writers claim that a wireless station can be heard at a much greater distance at night than in the day time; but I can hear several stations here at 12 a. m. as well as I can at night, especially the New Orleans station (HB) which is about 400 miles away from here; my aerial being only 38 feet high and 80 feet long.

A. 1.—There is quite a marked difference between the distance covered with wireless sets in day-time and at night. However, this difference is far more noticeable in some localities than in others. For instance, on the Gulf of Mexico, or anywhere in the tropics, distance cannot be covered in the day time unless an unreasonable amount of power is used. As soon as night has fallen, the distance is often increased three-fold and in fact 1,000 miles with a 2-kw. set becomes a common accomplishment. Perhaps the geographical location of your station is such as to be little affected by the changes from day to night. These changes are more noticeable on the seacoast.

Q. 2.—Can you tell me how to tune in the Poulsen station at El Paso, Texas, as I have not been able to hear same so far?

A. 2.—The Poulsen station at El Paso, we understand, employs an arc transmitter, as used in the Poulsen system. The waves emitted from such stations are usually of such a high frequency, as to be inaudible with the ordi-

nary wireless hook-up. To hear these stations it is necessary to use an apparatus known as the "ticker," a good simple example is explained in the May issue, page 88. The peroxide of lead detector also very often brings in such signals.

Q. 3.—Some say that a variable condenser in a receiving circuit will increase the receiving range considerably, but I have failed to find it so.

A. 3.—The motive for using a condenser is to vary the wave-length of a circuit by capacity. In a circuit we have two factors, namely, inductance and capacity. These determine the wave-length, and by altering either of these factors, the wave-length is affected. Incidentally, by getting the circuits in closer tune with the transmitter sending the waves, a greater efficiency is obtained. Probably in your circuits, the tuning is accomplished to such a marked degree of precision, as to render condensers useless. As this could barely be the fact, we believe that you have not given the correct hook-up to the condensers.

REGISTER FOR RECEIVING.

(996.) Frank Celestino, N. Y., states:

Q. 1.—Having gone through a conversation tonight, about wireless, I was asked this question: How do you receive wireless messages, with a register? I answered, "no, with telephone receivers."

A. 1.—The first system used in the reception of wireless messages, consisted of a glass tube filled with coarse nickel and silver filings, and a high resistance relay. This tube is still known as the coherer. The coherer works the relay which in turn closes the circuits of several other instruments among which a register is caused to make a permanent record on a strip of paper of the incoming signals. Owing to the comparative insensitiveness of the coherer in relation with the present telephonic reception, this system was abandoned. During the last few years, however, a relay known as "the resonance relay" has been perfected which works in conjunction with the ordinary silicon or galena detectors.

WIRELESS TELEPHONE.

(997.) E. W. Hutchinson, Mich., asks:

Q. 1.—Kindly inform me as to the size of the picture one should send to the wireless contest in your magazine; sometime ago I sent one in 3x2 inches and it was returned to me with a letter saying that it was too small.

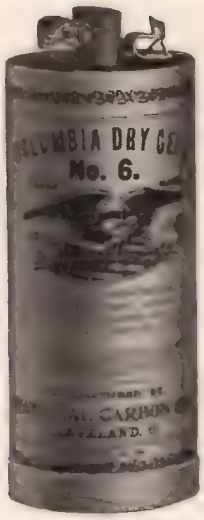
A. 1.—The larger the photograph is, the better it may be reproduced in the cut which appears in the magazine. Engravings for printing are usually made smaller than the original illustration, so that the detail lost in the photographic process may not be so noticeable. We would recommend photographs of the standard cabinet size, i.e. 4x5 inches.

Q. 2.—Can copper pyrites found in coal be used successfully in a perikon detector?

A. 2.—Yes, if sufficiently pure and not containing too many impurities.

Q. 3.—Two or three times as I have been receiving messages with my receivers I have

TRY IT



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been quite surprised to hear voices talking faintly, and I could distinguish the words here and there. Several other amateurs in the vicinity have heard the same thing, and as far as we know there is no wireless telephone station near, so what is the cause of the phenomenon? Your answers and explanation will be greatly appreciated.

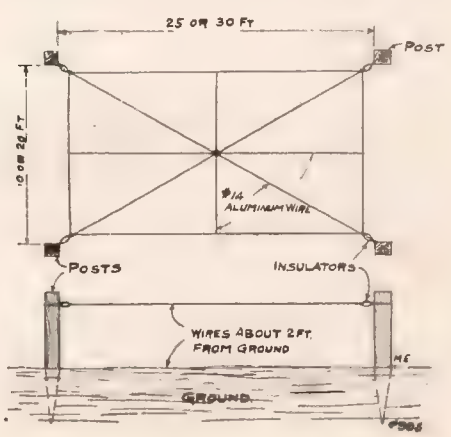
A. 3.—Undoubtedly you have heard a wireless telephone set working. We understand that a number of lake steamers have been equipped with wireless telephone sets and probably you have heard these communicating with the land stations. Usually a faint hissing sound accompanies the reception of telephone messages, and if you have noticed such a sound, you may rest assured that you are listening to a wireless telephone set.

HEAVY INDUCED CURRENTS.

(998.) Edward Forester, Ohio, informs us:

Q. 1.—I have had considerable trouble with a local telephone company in regard to my wireless telegraphy. My aerial is about 30 feet higher than this particular subscriber's line and at least 15 to 20 feet above the other lines. When I send it produces a loud noise in the telephone receiver. My aerial runs almost at right angles to this line and almost parallel to the main line. The telephone is grounded on a water pipe which is connected to the main and we live about four houses down the street. If you should know of any device or way of stopping this noise, I wish you would advise. Can the telephone company order me to stop if the aerial is over other people's property? (I have permission to put it there.) If it was entirely on my property could they stop me?

A. 1.—Where telephone lines run above ground, they are always affected more or less by wireless stations in the immediate vicinity. There is only one suggestion which we can make, and that is if you are using a plain aerial circuit, without any condenser or helix in your set, we recommend you to adopt these, for the potential induced in the telephone line will be far less. However, if you are using these, we can only suggest a reduction in your transmitting power, or wave-length, which may prove effective. A still better way would be not to use a ground at all, but to use the so-called counter-balance as shown below.



This acts as a ground. As to the legal problem which you ask us to solve, we believe that the telephone company has certain rights to prevent you from operating devices infringing on the efficiency of their service; even though said device be entirely on property not under their control.

A TESLA COIL.

(999.) Cha Sing, Hawaii, enquires:

Q. 1.—Please tell me how I can make a Tesla coil operate with a one inch coil, the size of wire and the amount required.

A. 1.—We would not suggest the use of a Tesla coil with a one inch coil, as the power of such a coil is too slight to produce the desired effects in a Tesla coil. However, a Tesla coil for a one inch coil may be made by winding 200 turns of No. 30 wire on a glass bottle around which will be a cardboard tube containing twenty turns of rubber insulated No. 16 wire. The proper condensers must be used in the oscillating circuit. See our book: Construction of induction coils and transformers. Price, prepaid, 25 cents.

Q. 2.—What size and how many sheets of tinfoil should be used in constructing a condenser of suitable size to prevent harmful sparking on the key of a ½-kw. coil on 110 volts, D.C.

A. 2.—To cut down the sparking on a key operating a ½-kw. coil, we would recommend 200 sheets of tinfoil 5x7 separated by paraffined or empire paper.

Q. 3.—How many sheets of tinfoil and glass plates (size of glass plates 10x12x1-16 inches thick) to make a sending condenser to be used on a one kw. transformer?

A. 3.—A total number of 60 sheets, arranged in two units connected in series, of 30 sheets each.

A ONE INCH WIRELESS COIL.

(1,000.) Norman Wetzel, Ohio, desires:

Q. 1.—Data for a one inch coil to be used on 110 volts alternating current. Should give a good wireless spark. Give weight of core wire and primary, also secondary.

A. 1.—Length of core 8½ inches, diameter of core 1 inch, the total weight of the core wire being about 1½ pounds. Number of primary wire No. 16, and two layers wound on the core. This will take approximately 1 pound. Number of secondary wire should be No. 34, and about 2 pounds will be required. Number of sections should be four, each being about 1¾ inch wide. At least a ⅛-inch thick, hard rubber tube should be used between the primary and secondary.

Q. 2.—Should this coil be used with a Gernsback interrupter and will you give the size of the glass plate condenser?

A. 2.—This coil has been designed to be used in connection with the Gernsback interrupter, or other type of electrolytic interrupter. A suitable size condenser would be one made of 6 sheets of glass .05 inch thick, and 8x10 inches, with tinfoil on each side, 6x8 inches.

DATA ON A TWO INCH COIL.

(1,001.) William Harsy, Cal., asks:

Q. 1.—In constructing a 2 inch coil, can single cotton-covered wire be used in the

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Standard Wireless Equipment Co.

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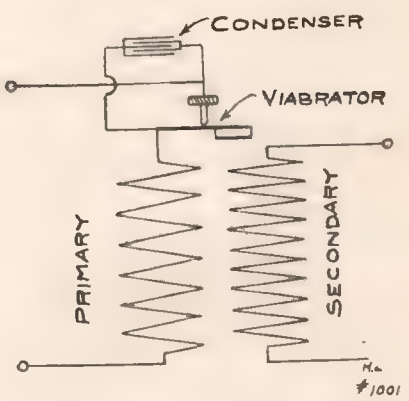
secondary? How much Empire cloth will I need to separate the secondary from the primary? How far can I send with this coil?

A. 1.—For the secondary, single silk-covered wire should be used, or enameled insulated wire may be substituted with even better results. Single cotton-covered is not recommended very highly for such windings. About six sheets of Empire cloth wound around a cardboard tube containing the primary will prove very efficient in insulating the secondary from the primary, and in fact more so than a rubber tube of reasonable thickness. Using 10 dry cells on this coil you should be able to cover a distance of 15 miles under favorable conditions.

Q. 2.—Are Edison primary batteries the best to use with this coil? Does the secondary have to be boiled in linseed oil? Kindly give size of a plate glass condenser for this coil, and dimensions of a helix. Will the ordinary Western Union key break the current for this coil?

A. 2.—Edison primary batteries are probably the best of primary batteries for this kind of work. However, we recommend storage cells for the best results. The secondary should be boiled in linseed oil. The size plates for the condenser should be 8x10 inches, with tinfoil on both sides, 6x8 inches. Two units of 6 plates each, connected in series, should be used. For a helix, we suggest 40 feet of No. 8 aluminum wire. A Western Union key can hardly be expected to break such a heavy current with the small contacts it has. A special key should be used, or larger contact points should be placed into the key.

Q. 3.—Kindly show a diagram of the inside connections of the coil with the vibrator and condenser.



A. 3.—We are giving you herewith the wiring diagram.

ADDRESSES OF WIRELESS COMPANIES.

(1002.) Stanley Burden, N. Y., asks:

Q. 1.—I wish to learn the address of the head offices of the United and Marconi wireless stations. Would also be grateful for any information concerning employment bureaus for wireless operators. I am a reader of your publication, and trust that it will not

be causing you too much trouble to furnish me with the above information.

A. 1.—United Wireless Co. head office, 42 Broadway; Marconi Wireless Co., 27 William Street, New York City.

LEARNING THE CODE.

(1003.) M. Sutter, N. J., writes:

Q. 1.—Would you kindly suggest a practical way to learn the art of receiving wireless messages by ear? I have been experimenting with wireless for some time, and can send up to thirty words a minute, both in Morse and Continental; but I am unable to become familiar with the receiving part.

A. 1.—We advise you to invest in an Omnigraph outfit as shown in our advertising columns. This instrument will send to you at any speed you desire. And by first transmitting slowly, you will become accustomed to the signals, and can increase your speed, from time to time.

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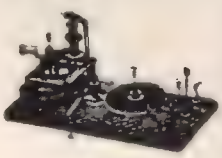

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ALL THE time, buying up manufacturers' surplus stocks; miscellaneous electrical material. Just now, 1,000 bargains for amateurs. Free price lists. Burtt Co., Wollaston, Mass.

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OFFER NO. 1.

Send us $1.00 cash, stamps, or money order, and in return, we will send you:

1—Modern Electrics for one year (August issue free) $1.00
2—Book, How to Make Wireless Instruments, cost ..... .25
3—Book, The Wireless Telephone, by H. Gernsback, cost ..... .25
4—Book, Construction of Induction Coils and Transformers, by H. W. Secor, cost.. .25

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(If books are to be mailed add 6c. postage)
TOTAL NET SAVING..... .75

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Send us $1.00 cash, stamps, or money order, and in return, we will send you:

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2—Linen Binder (automatic) holds 12 issues M. E., gold stamped..... .50
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GREAT WIREESS OFFER NO. 2.

Send us $1.00 cash, stamps, or money order, and in return, we will send you:

1—Modern Electrics for one year (August issue free) $1.00
2—Wirless Code Chart, cardboard; size 9x12 in., Morse, Navy and Continental codes .10
3—Wireless chart with 20 Wireless Standard "Hook-ups" ..... .10
4—Join the Wireless Association of America, and Wireless Pin ..... .10
5—Official Wireless Blue Book, 32 pages, and 13x10 in. chart of U. S. stations..... .10
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Send us $1.00 cash, stamps, or money order and in return, we will send you:

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2—12 back numbers of Modern Electrics, all consecutive numbers, all in good condition, each 10c. 1.20

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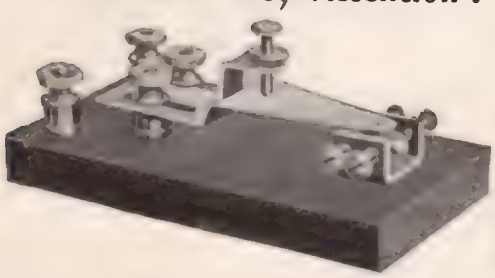

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By making such an enormous quantity we can put the price down to **$2.50.**

Professional style, heavy hard rubber base, **$4.00.**

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Send stamp to Dep't 6 for descriptive booklet and story on long distance wireless receivers, from $1.50 each up to $13.00 per set.

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If you have been using Copper or Galvanized Iron Wire for your Aerial, and the snow, sleet and strong winds of the winter has broken it down—why not construct a new Aerial with our extra strong Aluminum Wire—approximately 240 feet to the pound.

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Wireless Association of America

THE Wireless Association of America has been founded with the sole object of furthering the interests of wireless telegraphy and telephony in America.

We are now on the threshold of the wireless era, and just beginning to rub our intellectual eyes, as it were. Sometimes we look over the wall of our barred knowledge in amazement, wondering what lays beyond the wall, as yet covered with a dense haze.

However, young America, up to the occasion, is wide awake as usual.

Foreign wireless experts, invariably exclaim in wonder when viewing the photographs appearing in each month in the "Wireless Contest" of MODERN ELECTRICS. They cannot grasp the idea that boys 14 years old actually operate wireless stations successfully everyday in the year under all conditions but they are all of the undivided opinion that Young America leads the rest of the world wirelessly.

So far America has led in the race. The next thing is to stay in the front, and let others follow. In fact he would be a bold prophet who would even dare hint at the wonders to come during the next decade. The boy experimenting in an attic to-day may be an authority to-morrow.

As stated before the Wireless Association's sole aim is to further the interests of experimental wireless telegraphy and telephony in this country.

Headed by America's foremost wireless men, it is not a money-making institution. There are no membership fees, and no contributions required to become a member.

There are two conditions only. Each member of the Association must be an American citizen and MUST OWN A WIRELESS STATION, either for sending or for receiving or both.

The Association furnishes a membership button as per our illustration. This button is sold at actual cost. Price 20 cents.

This button is made of bronze, triple silverplated. The flashes from the wireless pole are laid in hard red enamel, which makes the button quite distinctive. The button furthermore has the usual screw back making it easy to fasten to buttonhole. The lettering itself is laid in black hard enamel. Size exactly as cut.

On account of the heavy plating it will last for years and is guaranteed not to wear "brassy." Beautiful solid gold button, $2.00.

Its diameter is 3-4 inch. This is a trifle larger than usual, the purpose being to show the button off so that it can be readily seen from a distance. The reason is obvious. Suppose you are a wireless experimenter and you live in a fairly large town. If you see a stranger with the Association button, you, of course, would not be backward talking to the wearer and in this manner become acquainted with those having a common object in mind, which is the successful development of "wireless."

The Association furthermore wishes to be of assistance to experimenters and inventors of wireless appliances and apparatus, if the owners are not capable to market or work out their inventions. Such information and advice will be given free. Somebody suggested that Wireless Clubs should be formed in various towns, and while this idea is of course feasible in the larger towns, it is fallacious in smaller towns where at best only two or three wireless experimenters can be found.

Most experimenters would rather spend their money in maintaining and enlarging their wireless stations, instead of contributing fees to maintain clubs or meeting rooms, etc., etc.

The Board of Directors of this Association earnestly request every wireless experimenter and owner of a station to apply for membership in the Association by submitting his name, address, location, instruments used, etc., etc., to the business manager. There is no charge or fee whatever connected with this.

Each member will be recorded and all members will be classified by town and State.

Members are at liberty to inquire from the Association if other wireless experimenters within their locality have registered. Such information will be furnished free if stamped return envelope is forwarded with inquiry.

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SPECIAL THIS MONTH

On receipt of 30 cents cash, stamps, or money order, we will send you above Wireless Button and the Third Annual Blue Book. Order to-day.

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How to build an efficient Spring Vibrator.
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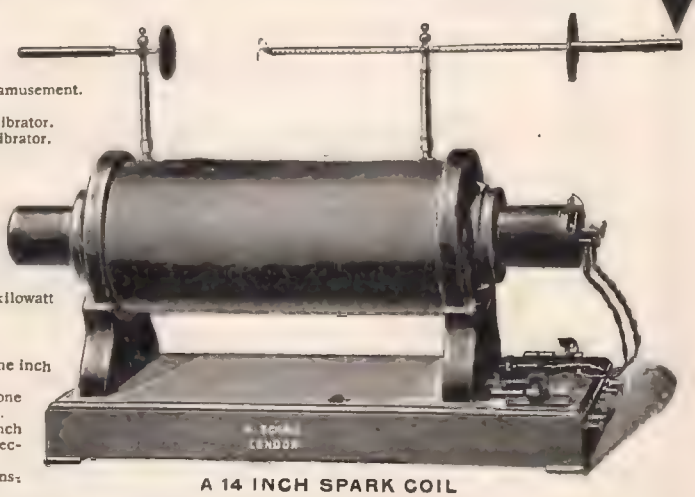
Air Insulated Tesla Coils.
A large Demonstration Tesla Coil.
Experimenting with the Tesla Coil.
The High Tension Transformer.
How to build one-half to 3-kilowatt Closed Core Transformers.

APPENDIX

Table of Spark Coil Dimensions one inch to twenty inch.
Table of Spark Coil Dimensions, one inch to twelve inch, *heavy spark.*
Table of Dimensions one-quarter inch to ten inch with enamel wire secondaries.
Table of open and closed Core Transformers ½ to 3 K. W.
Table of Glass Plate Condensers, for Transformers up to 5 kilowatt and spark coils 1 inch to 12 inch.
Table of Sparking Distances for various voltages. Inductivities of Dielectrics and method of finding condenser capacity.
Tables of turns per inch and feet per pound of insulated magnet wire.
Table of Soft Iron Core Weights. Tables giving the cost of wire, raw material, etc.



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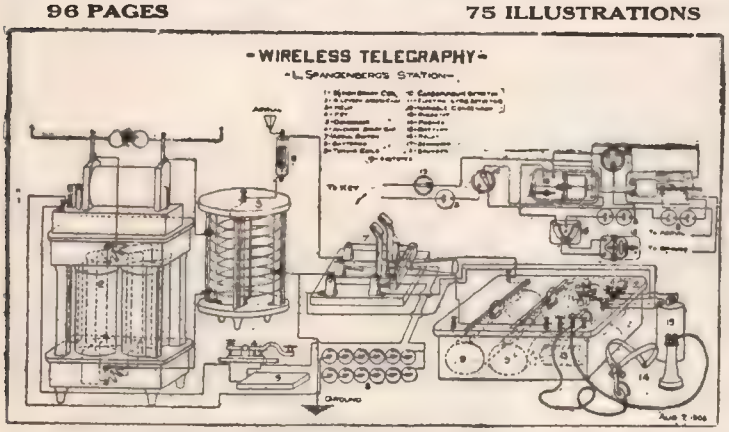

How to Make

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a microphone detector.
a simple antenna.
a spark gap muffler.
a 1000-ohm relay.
a carborundum detector.
a bare point electrolytic detector.
a selective tuner with weeding out circuit.
a coil vibrator attachment.
an electrolytic detector.
suspend and insulate aerials.
an iron pipe aerial.
a tantalum detector.
a small transformer.
a transmitting helix.
a potentionmeter.
an interupter and detector combined.
an electrical resonance apparatus.
a wireless without aerial.
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a tuning coil.
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Our new book is the only one of its kind and contains more information on the construction of wireless instruments and apparatus than any book ever published—no matter what its price.

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IMPROVED CONDENSER.

(Continued from Page 244.)

(4) by using the glass vessel shaped as in A A so as to allow a lower opening at C and at the same time the coating, B^1, is endless so that it has no edge and there is no break down to be feared. Such a coating can be made by silvering the glass. A separate metallic coating can be applied (5) by using the glass vessel A A and the sheet metal coating, B^1 B^1.

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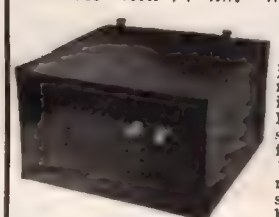

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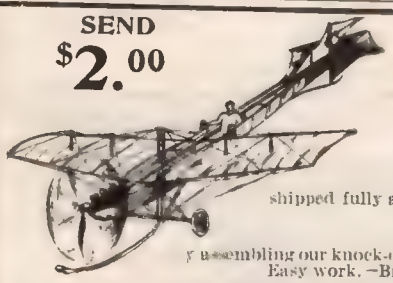
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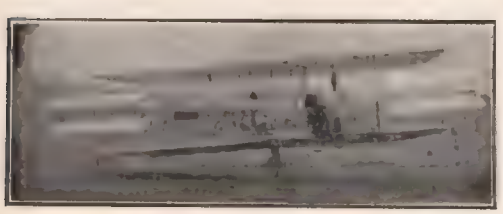
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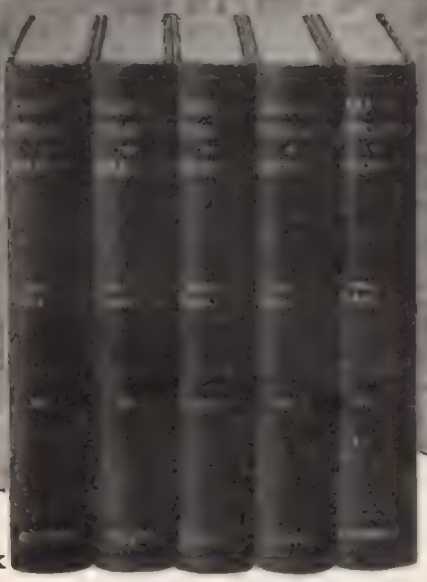

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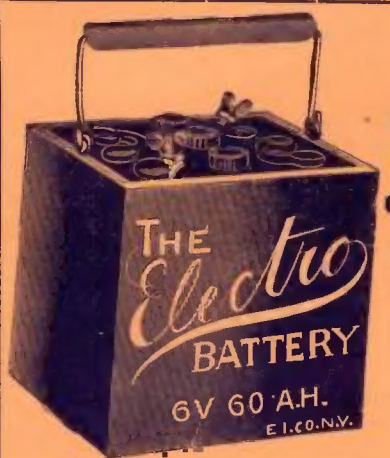

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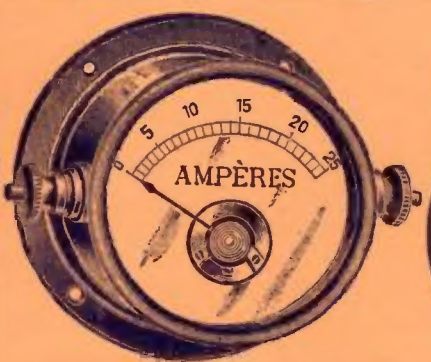

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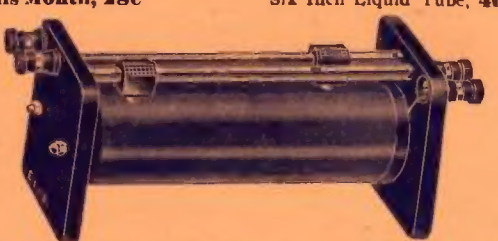

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